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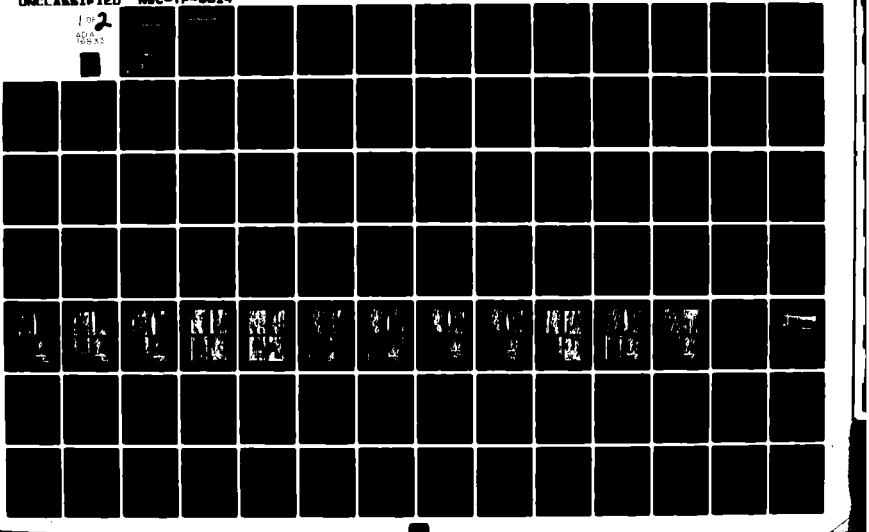

NWC TP 6314

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Coso Monitoring Program
January Through December 1980

by
C. R. Rodgers
Public Works Department

E. M. Edwards
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Range Department

DECEMBER 1981

NAVAL WEAPONS CENTER
CHINA LAKE, CALIFORNIA 93555

Naval Weapons Center

AN ACTIVITY OF THE NAVAL MATERIAL COMMAND

FOREWORD

This report presents the status of the Coso Monitoring Program conducted for calendar year 1980 by the Naval Weapons Center (NWC), China Lake, California. The investigation, funded under NWC Coso Geothermal Development Program, is being conducted to provide background information on Coso hydrology and rainfall in the area of the Coso Hot Springs.

This report was reviewed for technical accuracy by Carl F. Austin, Bruce L. Jackson, and James A. Whelan.

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(U) *Coso Monitoring Program, January Through December 1980*, by C. R. Rodgers, E. M. Edwards, and D. L. Bowles. China Lake, Calif., Naval Weapons Center, December 1981. 112 pp. (NWC TP 6314, publication UNCLASSIFIED.)

(U) The Coso Monitoring Program is a continuing effort in support of the geothermal development of Coso, which is located within the boundaries of the Naval Weapons Center. Data are presented on the monitoring of steam flows, water levels in ponds and wells, water chemistry, temperature logs of shallow wells, and rainfall at the Coso Resort. A weekly photographic investigation of the mud pots shows the variation of fluid levels in the mud pots during the wet and dry seasons.

CONTENTS

Tables:

INTRODUCTION

The objective of the Coso Monitoring Program is to provide background data on the well, steam flows, and pools at Coso Hot springs in order to document any significant changes in fluid levels and flows that may result from the development of this geothermal resource.

Data collected during the period covered in this report (January 1980 through December 1980) were obtained as a result of (1) steam flow monitoring at three sites, (2) a mud pot photographic investigation, (3) water level monitoring of five sites, (4) rainfall measurements, and (5) water analysis and temperature logs of three wells.

The monitoring program at Coso is the partial implementation of a monitoring plan developed in the summer of 1979 by Dr. James Whelan of the Geothermal Utilization Division at the Naval Weapons Center (NWC). Two additional wells and modification of the steam manifold at the Coso Well 1 site are the major elements of the plan yet to be implemented.

BACKGROUND

Status of the Coso Monitoring Program describing the monitoring of steam flows, water levels in pools and wells, water chemistry, temperature logs of shallow wells, rainfall at the Coso resort, and a weekly photographic investigation of the mud pots was reported in a technical publication covering the period from February 1978 through December 1979.[1]

Since the driving force of the need to monitor the Coso site is the requirement to protect the cultural resources (the hot springs), the monitoring effort must necessarily continue as long as geothermal development continues near the site or until it is established beyond any doubt that development will not affect the hot springs. A more likely event would be the modification of hot spring activity by seismic activity, which could either increase or decrease the supply of fluids to the hot springs rather than any geothermal development effects. In any event, monitoring will detect any variation from the norm in steam flows and will provide useful data on the variation of fluid levels in the mud pots, which have shown variations from dry in the summer to a depth of several inches in the spring.

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[1]Naval Weapons Center. *Coso Monitoring Program, February 1978-December 1979*, by C. R. Rodgers and others. China Lake, Calif., NWC, July 1980. (NWC TP 6195, publication UNCLASSIFIED.)

Figure 1 shows the location of the monitoring sites as specified in the monitoring plan. As of December 1980, no changes in monitoring equipment during the reporting period had been made with the exception of the installation of a continuous water level recorder on the south pool.

STEAM FLOW MONITORING

DEVILS KITCHEN CORROSION ARRAY

Steam flow monitoring of the Devils Kitchen corrosion array began in February 1978 in conjuction with the geothermal corrosion program. Monitoring has continued from FY 79 under the Coso environmental monitoring program.

The steam flow at the Devils Kitchen site is recorded on a clock-operated, Barton flow recorder equipped with a 25-inch water column differential pressure unit in combination with an orifice meter. Orifice diameter is 1.387 inches, which results in a calibration factor of 40.23. The product of calibration factor and chart value is steam flow in pounds per hour (pph). The instrument was recalibrated by the Barton representative in January 1980 and a new orifice meter installed.

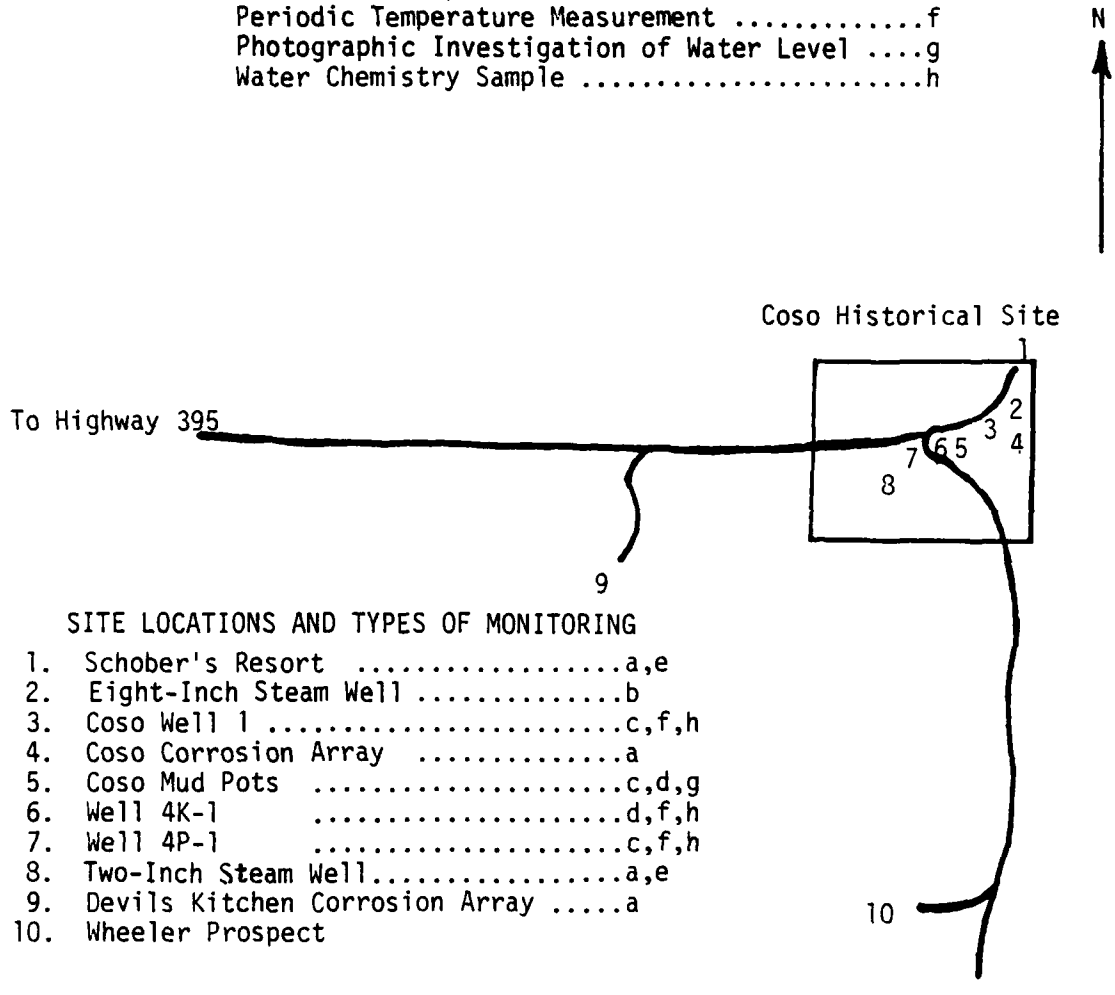
The high and low daily chart readings from the Devils Kitchen steam flow for 1980 are illustrated on the graph in Figure 2 and listed in Table A-1 of Appendix A. Steam flow in pph is computed in Table 1 and daily flows are compared for each month for calendar years 1978, 1979, and 1980. Monthly mean flows are shown as well as daily mean flows for the three-year periods. The flow rate is dependent on the amount of steam which enters the 55-gallon barrel collector and also on the amount which condenses in the flow line before passing through the orifice meter. The quantity of steam condensing is dependent on both steam and ambient temperature, and the convection coefficients for the steam line. Prior to 2 July 1979, the presence of corrosion samples on the arrays also had minor effects on the flow rates.

The high and low daily flow fluctuations are observed on all the steam flow monitoring sites at Coso and are due primarily to ambient temperature changes during the 24-hour period. Devils Kitchen is less affected than the Coso sites by temperature changes but all sites exhibit daily highs and lows in flow which are extracted for reporting and calculation of high and low mean values. Insulation of the steam lines would smooth the steam flow and reduce the variation of the flow about the mean.

Yearly mean data and standard deviation for the high and low daily Devils Kitchen flows are shown in Table 2. As the values indicate, there is little variation in steam flow through this array.

TYPES OF COSO MONITORING

Continuous Steam Flow Measuring .....a
Periodic Steam Flow Measuring .....b
Continuous Water Level Measurement c
Periodic Water Level Measurement .....d
Continuous Temperature Measurement .....e
Periodic Temperature Measurement .....f
Photographic Investigation of Water Level ....g
Water Chemistry Sample .....h



SITE LOCATIONS AND TYPES OF MONITORING

1. Schober's Resort .....a,e
2. Eight-Inch Steam Well .....b
3. Coso Well 1 .....c,f,h
4. Coso Corrosion Array .....a
5. Coso Mud Pots .....c,d,g
6. Well 4K-1 .....d,f,h
7. Well 4P-1 .....c,f,h
8. Two-Inch Steam Well.....a,e
9. Devils Kitchen Corrosion Array .....a
10. Wheeler Prospect

Scale 1 inch = 1 mile

FIGURE 1. Coso Monitoring Sites.

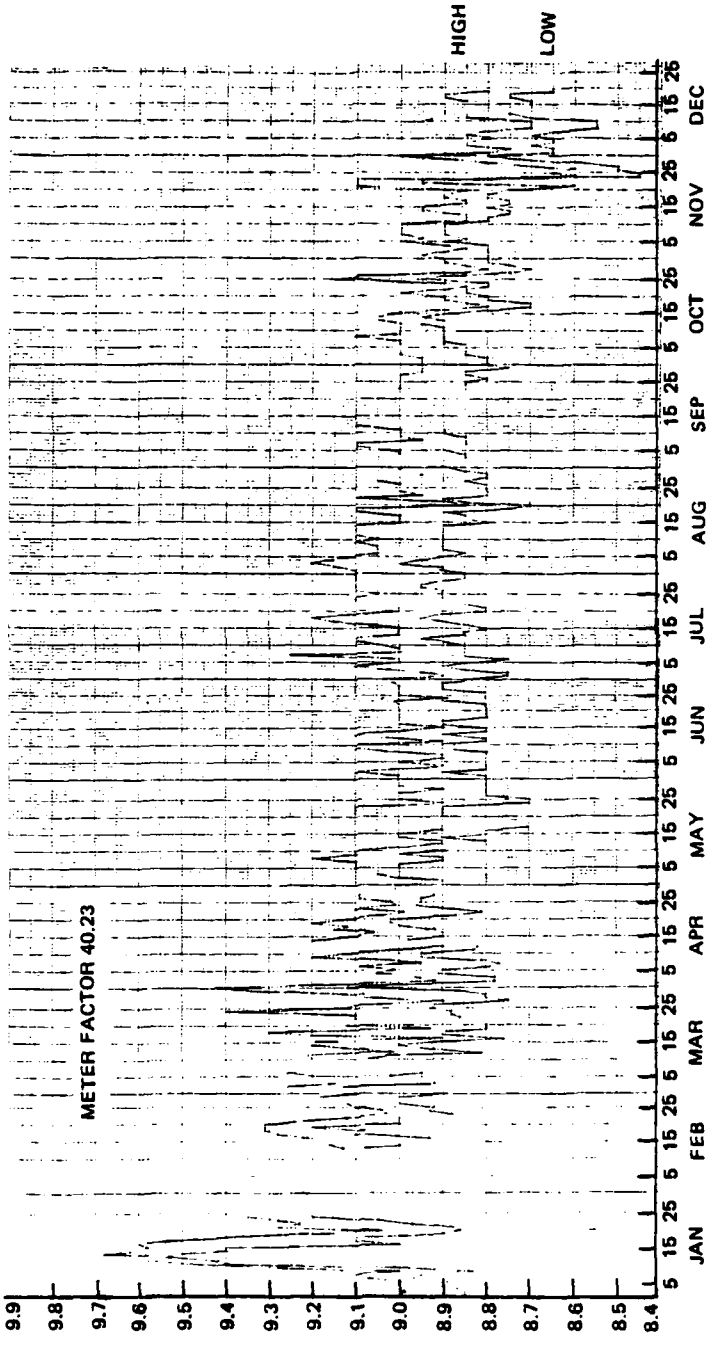


FIGURE 2. Devils Kitchen Steam Flow Meter Values, 1980.

TABLE 1. Steam Flows at Devils Kitchen Corrosion Array Site for 1978 Through 1980.

January								
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	366.5	...	...	...	360.4	...
2	...	362.5	365.7	364.1	...	358.4	360.4	359.4
3	...	366.5	366.5	366.5	...	358.4	361.2	359.8
4	...	362.5	367.3	364.9	...	358.4	361.6	360.0
5	...	366.5	366.5	366.5	...	362.5	362.0	362.3
6	...	366.5	370.6	368.6	...	358.4	365.3	361.9
7	...	358.4	370.6	364.5	...	354.3	364.5	359.4
8	...	362.5	366.5	364.5	...	354.3	359.6	357.0
9	...	366.5	376.7	371.6	...	354.3	366.5	360.4
10	...	362.5	386.9	374.7	...	354.3	382.8	368.6
11	...	370.6	390.1	380.4	...	366.5	383.6	375.1
12	...	370.6	388.1	379.4	...	358.4	382.8	370.6
13	...	362.5	391.0	376.8	...	354.3	386.9	370.6
14	...	370.6	391.8	381.2	...	366.5	382.8	374.7
15	...	370.6	390.1	380.4	...	362.5	382.8	372.7
16	...	366.5	391.0	378.8	...	358.4	366.5	362.5
17	...	370.6	386.9	378.8	...	366.5	370.6	368.6
18	...	366.5	382.8	374.7	...	354.3	370.6	362.5
19	...	362.5	374.7	368.6	...	354.3	362.4	358.4
20	...	362.5	368.6	365.6	...	354.3	360.8	357.6
21	...	370.6	377.9	374.3	...	366.5	361.6	364.1
22	...	370.6	375.9	374.3	...	358.4	365.3	361.9
23	...	366.5	377.9	372.2	...	362.5	368.6	365.6
24	...	374.7	380.8	377.8	...	366.5	374.7	370.6
25	...	374.7	...	...	...	354.3	...	...
26	...	...	...	...	...	...	...	...
27	...	...	...	...	...	...	...	...
28	...	...	...	...	...	...	...	...
29	...	...	...	...	...	...	...	...
30	...	...	...	...	...	...	...	...
31	...	...	...	...	...	...	...	...
Mean	...	366.9	378.0	372.6	...	359.1	369.3	364.5

TABLE 1. (Contd.)

	February							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	...	...	...	...	...	...
2	...	366.5	...	...	...	358.4	...	...
3	...	366.5	...	...	...	358.4	...	...
4	...	370.6	...	...	...	362.5	...	...
5	...	370.6	...	...	...	362.5	...	...
6	...	368.6	...	...	...	362.5	...	...
7	...	370.6	...	...	...	362.5	...	...
8	...	366.5	...	...	...	362.5	...	...
9	...	370.6	...	...	...	362.5	...	...
10	...	370.6	...	...	...	366.5	...	...
11	...	368.6	...	...	...	362.4	...	...
12	...	370.6	...	...	...	366.5	...	...
13	...	374.7	367.3	371.0	...	366.5	365.3	365.9
14	...	378.7	368.5	373.6	...	362.4	362.1	362.3
15	...	368.6	...	...	...	362.4	...	...
16	...	370.6	370.5	370.6	...	362.4	359.3	360.9
17	...	366.5	373.3	369.9	...	358.4	366.1	362.3
18	...	374.7	374.5	374.6	...	366.5	365.3	365.9
19	...	370.6	374.5	372.6	...	362.4	370.2	366.3
20	...	374.7	370.1	372.4	...	362.4	362.1	362.3
21	...	368.6	370.9	369.8	...	358.4	362.1	360.3
22	...	...	366.1	...	...	...	362.1	...
23	366.5	...	363.3	364.9	362.4	...	357.2	359.8
24	374.6	...	363.7	369.2	366.5	...	359.2	362.9
25	376.7	...	366.1	371.4	366.5	...	358.9	362.7
26	378.7	372.6	366.9	372.7	370.6	358.4	362.1	363.7
27	374.6	366.5	...	370.6	368.5	356.3	...	362.4
28	378.7	374.7	369.3	374.2	370.6	364.5	362.1	365.7
29	...	...	366.1	...	...	...	358.0	...
30	...	...	...	...	...	...	...	...
31	...	...	...	...	...	...	...	...
Mean	375.0	370.5	368.7	371.3	367.5	362.1	362.1	363.1

TABLE 1. (Contd.)

	March							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	378.7	376.7	...	377.7	370.6	362.4	...	366.5
2	376.7	362.5	372.5	370.6	370.6	354.3	367.3	364.1
3	374.6	360.4	368.1	367.7	366.5	354.3	358.9	359.9
4	382.8	362.5	...	372.7	370.6	354.3	...	362.5
5	380.8	362.5	370.1	371.1	374.6	354.3	362.9	363.9
6	374.6	362.5	372.5	369.9	368.5	354.3	360.1	361.0
7	374.6	370.6	...	372.6	368.5	360.4	...	364.5
8	380.8	370.6	...	375.7	374.6	366.5	...	370.6
9	386.9	366.5	...	376.7	374.6	358.4	...	366.5
10	378.7	362.5	370.1	370.4	374.6	354.3	364.9	364.6
11	378.7	366.5	370.5	371.9	374.6	358.4	363.3	365.4
12	378.7	370.6	362.9	370.7	370.6	362.4	354.4	362.5
13	378.7	366.5	366.1	370.4	366.5	354.3	358.9	359.9
14	374.6	362.5	370.1	369.1	366.5	358.4	362.1	362.3
15	374.6	372.6	369.7	372.3	366.5	362.4	358.0	362.3
16	376.7	368.6	358.0	367.8	368.5	362.4	352.4	361.1
17	378.7	364.5	370.1	371.1	370.6	358.4	358.0	362.3
18	386.8	368.6	374.1	376.5	376.7	358.4	361.3	365.5
19	384.8	366.5	359.3	370.2	374.6	362.4	354.0	363.7
20	378.7	366.5	366.9	370.7	374.6	362.4	354.0	363.7
21	380.8	366.5	...	373.7	374.6	358.4	...	366.5
22	378.7	362.4	366.1	369.1	374.6	358.4	356.4	363.1
23	378.7	362.4	366.1	369.1	370.6	356.3	357.2	361.4
24	372.6	366.5	370.1	369.7	366.5	358.4	357.2	360.7
25	376.7	372.6	366.9	372.1	370.6	366.5	359.3	365.5
26	378.7	374.7	366.1	373.2	374.6	366.5	358.9	366.7
27	378.7	370.6	358.0	369.1	374.6	362.4	352.0	363.0
28	378.7	370.6	365.3	371.5	372.6	360.4	354.0	362.3
29	378.7	356.3	365.3	366.8	372.6	346.2	354.0	357.6
30	378.7	366.5	374.1	373.1	370.6	354.3	356.4	360.4
31	382.8	366.5	379.0	376.1	374.6	354.3	366.9	365.3
Mean	378.8	366.7	367.9	371.6	371.6	358.5	358.5	363.4

TABLE 1. (Contd.)

	April							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	380.8	366.5	369.3	372.2	374.6	362.5	362.1	366.4
2	378.7	370.6	358.9	369.4	370.6	358.4	353.2	360.7
3	374.6	362.5	360.5	365.9	370.6	354.3	353.2	359.4
4	380.8	366.5	382.2	376.5	372.6	358.4	358.5	363.2
5	378.7	370.6	362.5	370.6	370.6	362.5	358.0	363.7
6	382.8	368.6	365.7	372.4	378.7	362.5	354.0	365.1
7	378.7	362.5	360.1	367.1	370.6	358.4	352.8	360.6
8	374.6	366.5	362.9	368.0	366.5	358.4	354.4	359.8
9	372.6	374.7	370.1	372.5	364.5	362.5	360.1	362.4
10	374.6	366.5	366.5	369.2	366.5	358.4	360.1	361.7
11	378.7	366.5	362.1	369.1	372.6	358.4	355.2	362.1
12	378.7	362.5	358.0	366.4	374.6	354.3	354.8	361.2
13	378.7	366.5	...	372.6	374.6	358.4	...	366.5
14	378.7	366.5	370.1	371.8	370.6	358.4	361.3	363.4
15	382.8	366.5	366.1	371.8	370.6	358.4	358.0	362.3
16	374.6	370.6	364.5	369.9	362.4	362.5	358.0	361.0
17	368.5	366.5	368.1	367.7	362.4	362.5	358.9	361.3
18	374.6	362.5	366.9	368.0	366.5	354.3	362.1	361.0
19	378.7	358.4	370.1	369.1	372.6	350.2	362.9	361.9
20	378.7	362.5	366.9	369.4	372.6	354.3	362.9	363.3
21	374.6	366.5	364.1	368.4	366.5	358.4	356.8	360.6
22	372.6	366.5	357.6	365.6	366.5	358.4	354.4	359.8
23	374.6	362.5	366.1	367.7	366.5	358.4	357.2	360.7
24	374.6	362.5	362.5	366.5	370.6	354.3	360.5	361.8
25	374.6	362.5	362.9	366.7	370.6	354.3	360.1	361.7
26	370.6	366.5	365.7	367.6	366.5	358.4	360.1	361.7
27	370.6	362.5	365.7	366.3	366.5	354.3	358.9	359.9
28	374.6	362.5	...	368.6	366.5	358.4	...	362.5
29	378.7	366.5	362.5	369.2	366.5	358.4	325.5	350.1
30	380.8	370.6	362.5	371.3	372.6	362.5	325.5	353.5
31	...	...	...	...	...	...	...	...
Mean	376.5	365.8	365.0	369.3	369.5	358.3	355.7	361.3

TABLE 1. (Contd.)

	May							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	374.7	370.6	358.0	367.8	366.5	354.3	354.0	358.3
2	370.6	362.5	362.1	365.1	362.4	354.3	354.0	356.9
3	378.7	358.4	364.1	367.1	366.5	354.3	354.0	358.2
4	382.8	362.5	...	372.7	370.6	354.3	...	362.5
5	374.6	370.6	366.1	370.4	362.4	362.5	362.1	362.3
6	370.6	370.6	366.1	369.1	362.4	362.5	362.1	362.3
7	370.6	366.5	366.1	367.7	358.4	358.4	358.0	358.3
8	368.5	362.5	370.1	367.0	362.4	354.3	358.1	358.3
9	374.6	358.4	366.1	366.4	368.5	350.2	362.1	360.3
10	370.6	358.4	366.1	365.0	362.4	350.2	358.0	356.9
11	370.6	358.4	362.1	363.7	362.4	350.2	354.0	355.5
12	370.6	362.5	358.1	363.7	358.4	354.3	354.0	355.6
13	376.7	366.5	358.1	367.1	366.5	358.4	354.0	359.6
14	374.6	366.5	362.1	367.7	370.6	362.5	358.0	363.7
15	378.7	366.5	362.1	369.1	366.5	362.5	354.0	361.0
16	366.5	366.5	358.0	363.7	358.4	362.5	354.0	358.3
17	372.6	362.5	358.0	364.4	358.4	358.4	350.0	355.6
18	366.5	366.5	...	366.5	366.5	358.4	...	362.5
19	370.6	370.6	...	370.6	362.4	362.5	...	362.5
20	374.6	362.5	...	368.6	366.5	358.4	...	362.5
21	374.6	362.5	366.1	367.8	366.5	354.3	358.0	360.4
22	374.6	366.5	366.1	369.1	370.6	354.3	358.0	361.0
23	370.6	366.5	366.1	367.7	362.5	358.4	358.0	359.6
24	374.7	362.5	358.0	365.1	366.5	358.4	350.0	358.3
25	370.6	362.5	362.1	365.1	366.5	358.4	350.0	358.3
26	366.5	366.5	362.1	365.0	362.5	358.4	354.0	358.3
27	370.6	366.5	362.1	366.4	362.5	358.4	354.0	358.3
28	372.6	366.5	358.0	365.7	362.5	358.4	354.0	358.3
29	376.7	362.5	362.1	367.1	366.5	354.3	354.0	358.3
30	378.7	362.5	362.1	367.8	374.7	354.3	354.0	361.0
31	374.7	362.5	362.1	366.4	366.5	354.3	354.0	358.3
Mean	373.0	364.4	362.6	367.0	364.7	356.9	355.5	359.4

TABLE 1. (Contd.)

	June							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	374.7	362.5	362.1	366.4	370.6	358.4	354.0	361.0
2	372.6	366.5	366.1	368.4	366.5	358.4	358.0	361.0
3	372.6	366.5	362.1	367.1	362.5	358.4	354.0	358.3
4	370.6	366.5	358.0	365.0	364.5	358.4	354.0	359.0
5	370.6	370.6	362.1	367.8	364.5	362.5	354.0	360.3
6	372.6	374.7	358.0	368.4	362.5	362.5	354.0	359.0
7	374.7	366.5	358.0	366.4	370.6	354.3	350.0	358.2
8	374.7	362.5	362.1	366.4	366.5	354.3	354.0	358.3
9	374.7	362.5	366.1	367.8	366.5	354.3	358.0	359.6
10	374.7	366.5	366.1	369.1	366.5	358.4	358.0	361.0
11	370.6	370.6	358.0	366.4	362.5	362.5	354.0	359.7
12	370.6	366.5	362.1	366.4	362.5	362.5	354.0	359.7
13	370.6	370.6	366.1	369.1	362.5	362.5	358.0	361.0
14	370.6	370.6	362.1	367.8	366.5	366.5	354.0	362.3
15	372.6	374.7	358.0	368.4	366.5	362.5	354.0	361.0
16	370.6	374.7	362.1	369.1	362.5	366.5	358.0	362.3
17	370.6	366.5	362.1	366.4	362.5	358.4	358.0	359.6
18	374.7	362.5	362.1	366.4	366.5	346.1	354.0	355.5
19	374.7	366.5	362.1	367.8	366.5	358.4	354.0	359.6
20	370.6	366.5	362.1	366.4	366.5	362.5	354.0	361.0
21	374.7	370.6	362.1	369.1	366.5	362.5	354.0	361.0
22	374.7	366.5	362.1	367.8	366.5	362.5	354.0	361.0
23	370.6	370.6	362.4	367.9	366.5	362.5	358.0	362.3
24	370.6	370.6	362.1	367.8	366.5	362.5	354.4	361.1
25	374.7	366.5	357.6	366.3	366.5	362.5	354.0	361.0
26	374.7	366.5	362.1	367.8	366.5	362.5	354.0	361.0
27	368.6	370.6	362.1	367.1	362.5	362.5	357.6	360.9
28	366.5	370.6	362.1	366.4	362.5	362.5	357.6	360.9
29	370.6	370.6	362.5	367.9	362.5	362.5	357.6	360.9
30	370.6	374.7	363.7	369.7	362.5	366.5	356.0	361.7
31	...	...	...	...	...	...	...	...
Mean	372.2	368.4	361.9	367.5	365.2	360.6	355.2	360.3

TABLE 1. (Contd.)

	July							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	370.6	374.7	358.0	367.8	366.5	366.5	352.0	361.7
2	374.7	366.5	360.0	367.1	366.5	362.5	352.0	360.3
3	370.6	366.5	364.1	367.1	366.5	362.5	356.0	361.7
4	370.6	366.5	366.1	367.7	366.5	362.5	358.0	362.3
5	370.6	366.5	362.1	366.4	366.5	362.5	356.0	361.7
6	370.6	366.5	362.1	366.4	366.5	358.4	352.0	359.0
7	370.6	366.5	372.1	369.7	366.5	358.4	356.0	360.3
8	370.6	366.5	362.1	366.4	362.5	358.4	356.0	359.0
9	374.7	366.5	362.1	367.8	366.5	362.5	356.0	361.7
10	374.7	374.7	364.1	371.2	366.5	362.5	356.0	361.7
11	374.7	370.6	366.1	370.5	366.5	362.5	358.0	362.3
12	370.6	370.6	366.1	369.1	366.5	362.5	360.1	363.0
13	370.6	374.7	362.1	369.1	362.5	366.5	356.0	361.7
14	370.6	374.7	362.1	369.1	362.5	366.5	356.0	361.7
15	374.7	370.6	362.1	369.1	366.5	366.5	354.0	362.3
16	374.7	370.6	366.1	370.5	366.5	362.5	356.0	361.7
17	370.6	370.6	368.1	369.8	366.5	362.5	358.0	362.3
18	370.6	374.7	370.1	371.8	362.5	366.5	360.1	363.0
19	370.6	374.7	366.1	370.5	362.5	358.4	358.0	359.6
20	374.7	366.5	362.1	367.8	366.5	362.5	354.0	361.0
21	370.6	370.6	362.1	367.8	362.5	362.5	354.0	359.7
22	370.6	370.6	...	370.6	362.5	362.5	356.0	360.3
23	370.6	370.6	366.1	369.1	362.5	362.5	...	362.5
24	368.6	370.6	366.1	368.4	354.3	362.5	358.0	358.3
25	366.5	370.6	364.1	367.1	358.4	362.5	358.0	359.6
26	370.6	370.6	366.1	369.1	362.5	362.5	358.0	361.0
27	374.7	370.6	366.1	370.5	366.5	362.5	360.1	363.0
28	374.7	370.6	366.1	370.5	362.5	362.5	360.1	361.7
29	374.7	366.5	366.1	369.1	366.5	362.5	358.0	362.3
30	374.7	366.5	366.1	369.1	366.5	362.5	356.0	361.7
31	376.7	366.5	366.1	369.8	368.6	362.5	356.0	362.4
Mean	372.1	369.8	364.6	368.9	364.6	362.6	356.5	361.3

TABLE 1. (Contd.)

	August							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	374.7	370.6	366.1	370.5	366.5	362.5	358.0	362.3
2	374.7	370.6	368.1	371.1	366.5	366.5	358.0	363.7
3	374.7	370.6	370.1	371.8	366.5	366.5	362.1	365.0
4	374.7	370.6	368.1	371.1	362.5	362.5	360.1	361.7
5	372.6	366.5	366.1	368.4	362.5	362.5	358.0	361.0
6	370.6	366.5	364.1	367.1	362.5	362.5	356.0	360.3
7	374.7	370.6	364.1	369.8	362.5	362.5	358.0	361.0
8	374.7	366.5	364.1	368.4	366.5	362.5	358.0	362.3
9	374.7	366.5	366.1	369.1	358.4	362.5	358.0	359.6
10	374.7	366.5	364.1	368.4	366.5	362.5	358.0	362.3
11	372.6	366.5	366.1	368.4	362.5	358.4	358.0	359.6
12	374.7	370.6	366.1	370.5	366.5	362.5	358.0	362.3
13	370.6	366.5	366.1	367.7	362.5	362.5	358.0	361.0
14	370.6	366.5	366.1	367.7	366.5	358.4	358.0	361.0
15	374.7	366.5	362.1	367.8	362.5	362.5	354.0	359.0
16	374.7	366.5	362.1	367.8	370.6	358.4	356.0	361.7
17	374.7	362.5	362.1	366.4	362.5	358.4	356.0	359.0
18	374.7	366.5	366.1	369.1	358.4	358.4	358.0	358.3
19	374.7	370.6	356.0	367.1	366.5	362.5	352.0	360.3
20	370.6	366.5	358.0	365.0	366.5	362.5	350.0	359.7
21	370.6	362.5	364.0	365.7	362.5	358.4	356.0	359.0
22	374.7	366.5	366.1	369.1	366.5	358.4	358.0	361.0
23	370.6	366.5	360.1	365.7	362.5	362.5	354.0	359.7
24	370.6	370.6	362.1	367.8	362.5	362.5	354.0	359.7
25	370.6	370.6	...	370.6	362.5	362.5	354.0	359.7
26	370.6	366.5	362.1	366.4	362.5	362.5	354.0	359.7
27	370.6	366.5	364.0	367.0	362.5	362.5	356.0	360.3
28	370.6	370.6	...	370.6	362.5	362.5	354.0	359.7
29	370.6	366.5	360.1	365.7	366.5	362.5	354.0	361.0
30	374.7	366.5	...	370.6	366.5	358.4	356.0	360.2
31	374.7	366.5	362.1	367.8	366.5	362.5	358.0	362.3
Mean	373.0	367.6	364.0	368.4	364.1	361.7	356.5	360.7

TABLE 1. (Contd.)

	September							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	370.6	366.5	...	368.6	362.5	362.5	...	362.5
2	370.6	366.5	...	368.6	366.5	358.4	...	362.5
3	370.6	370.6	...	370.6	362.5	362.5	...	362.5
4	370.6	366.5	362.1	366.4	362.5	362.5	356.0	360.3
5	370.6	362.5	362.1	365.1	366.5	358.4	356.0	360.3
6	366.5	366.5	366.1	366.4	362.5	358.4	358.0	359.6
7	366.5	366.5	366.1	366.4	358.4	362.5	...	360.5
8	366.5	366.5	360.1	364.4	358.4	362.5	356.0	359.0
9	366.5	366.5	362.1	365.0	362.5	362.5	356.0	360.3
10	370.6	366.5	362.1	366.4	362.5	362.5	356.0	360.3
11	370.6	370.6	362.1	367.8	358.4	362.5	358.0	359.6
12	366.5	370.6	366.1	367.7	362.5	362.5	358.0	361.0
13	370.6	370.6	...	370.6	362.5	362.5	...	362.5
14	370.6	366.5	...	368.6	358.4	362.5	...	360.5
15	362.5	366.5	...	364.5	358.4	362.5	...	360.5
16	370.6	366.5	...	368.6	362.5	362.5	...	362.5
17	374.7	366.5	...	370.6	358.4	362.5	...	360.5
18	366.5	366.5	...	366.5	354.3	362.5	...	358.4
19	362.5	370.6	...	366.6	354.3	362.5	...	358.4
20	366.5	366.5	...	366.5	354.3	362.5	...	358.4
21	366.5	366.5	...	366.5	362.5	362.5	...	362.5
22	366.5	366.5	...	366.5	358.4	362.5	...	360.5
23	366.5	366.5	362.1	365.0	358.4	362.5	356.0	359.0
24	366.5	366.5	362.1	365.0	362.5	362.5	356.0	360.3
25	370.6	366.5	362.1	366.4	362.5	358.4	356.0	359.0
26	370.6	366.5	362.1	366.4	362.5	358.4	354.0	358.3
27	370.6	366.5	362.1	366.4	362.5	362.5	356.0	360.3
28	370.6	362.5	360.1	364.4	362.5	358.4	356.0	359.0
29	370.6	366.5	358.0	365.0	362.5	358.4	352.0	357.6
30	370.6	366.5	360.1	365.7	364.5	362.5	354.0	360.3
31	...	...	...	...	...	...	...	...
Mean	368.7	366.9	362.2	366.7	360.9	361.5	355.8	360.2

TABLE 1. (Contd.)

	October							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	370.6	362.5	360.1	364.1	362.5	358.4	354.0	358.3
2	370.6	362.5	360.1	364.7	362.5	358.4	354.0	358.3
3	370.6	362.5	362.1	365.1	362.5	358.4	356.0	359.0
4	370.6	362.5	362.1	365.1	364.5	358.4	356.0	359.6
5	370.6	366.5	...	368.6	362.5	358.4	...	360.5
6	370.6	370.6	362.1	367.8	362.5	362.5	356.0	360.3
7	370.6	370.6	362.1	367.8	362.5	362.5	358.0	361.0
8	370.6	370.6	366.1	369.1	362.5	366.5	358.0	362.3
9	366.5	366.5	362.1	365.0	362.5	358.5	358.0	359.7
10	366.5	362.5	362.1	363.7	358.4	358.4	358.0	358.3
11	370.6	366.5	362.1	366.4	362.5	362.5	358.0	361.0
12	370.6	370.6	362.1	367.8	362.5	366.5	360.1	363.0
13	366.5	370.6	364.1	367.1	358.4	366.5	358.0	361.0
14	366.5	362.5	364.1	364.4	358.4	358.4	360.1	359.0
15	370.6	362.5	362.1	365.1	362.5	358.4	358.0	359.6
16	370.6	366.5	358.0	365.0	366.5	358.4	354.0	359.6
17	366.5	370.6	354.0	363.7	358.4	366.5	350.0	358.3
18	362.5	370.6	356.0	363.0	358.4	366.5	350.0	358.3
19	362.5	374.7	358.0	365.1	358.4	370.6	354.0	361.0
20	366.5	370.6	358.0	365.0	362.5	362.5	354.0	359.7
21	370.6	362.5	362.1	365.1	358.4	354.3	356.0	356.2
22	362.5	362.5	358.0	361.0	354.3	358.4	356.0	356.2
23	366.5	366.5	356.0	363.0	354.3	358.4	354.0	355.6
24	370.6	366.5	358.0	365.0	362.5	362.5	354.0	359.7
25	362.5	370.6	368.1	367.1	358.4	362.5	360.1	360.3
26	362.5	362.5	366.1	363.7	354.3	358.4	358.0	356.9
27	366.5	366.5	356.0	363.0	358.4	358.4	352.0	356.3
28	366.5	370.6	354.0	363.7	362.5	362.5	350.0	358.3
29	370.6	362.5	356.0	363.0	366.5	354.3	352.0	357.6
30	366.5	366.5	358.0	363.7	358.4	358.4	354.0	356.9
31	358.4	366.5	358.0	361.0	354.3	362.5	354.0	356.9
Mean	367.6	366.7	360.3	364.9	360.4	360.9	355.5	359.0

TABLE 1. (Contd.)

	November							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	362.5	362.5	360.1	361.7	358.4	358.4	354.0	357.0
2	362.5	366.5	358.0	362.3	358.4	358.4	354.0	357.0
3	362.5	370.6	356.0	363.0	354.3	366.5	354.0	358.3
4	366.5	362.5	358.0	362.3	358.4	358.4	354.0	356.9
5	370.6	362.5	362.1	365.1	362.5	354.3	358.0	358.3
6	366.5	366.5	360.1	364.4	358.4	362.5	356.0	359.0
7	366.5	370.6	362.1	366.4	358.4	366.5	362.1	362.3
8	370.6	366.5	362.1	366.4	366.5	362.5	362.1	363.7
9	378.7	366.5	362.1	369.1	370.6	362.5	362.1	365.1
10	374.7	...	362.1	368.4	366.5	...	362.1	364.3
11	370.6	366.5	...	368.6	358.4	362.5	354.0	358.3
12	362.5	362.5	356.0	360.3	354.3	358.4	354.0	355.6
13	362.5	366.5	356.0	361.7	362.5	358.4	352.0	357.6
14	362.5	362.5	360.1	361.7	358.4	358.4	352.0	356.3
15	362.5	362.5	360.1	361.7	358.4	354.3	354.0	355.6
16	366.5	370.6	356.0	364.4	358.4	362.5	352.0	357.6
17	366.5	374.7	356.0	365.7	362.5	362.5	352.0	359.0
18	...	366.5	358.0	362.3	...	358.4	354.0	356.2
19	...	362.5	358.0	360.2	...	358.4	354.0	356.2
20	...	370.6	356.0	363.3	...	358.4	352.0	355.2
21	366.5	370.6	366.1	367.7	358.4	358.4	346.0	354.3
22	362.5	366.5	366.1	365.0	354.3	362.5	360.1	359.0
23	362.5	370.6	366.1	366.4	354.3	362.5	360.1	359.0
24	370.6	370.6	346.0	362.4	362.5	358.4	340.0	353.6
25	362.5	358.4	348.0	356.3	358.4	354.3	340.0	350.9
26	362.5	358.4	346.0	355.6	354.3	354.3	342.0	350.2
27	358.4	362.5	350.0	357.0	354.3	358.4	342.0	351.6
28	362.5	362.5	354.0	360.7	354.3	354.3	346.0	351.5
29	362.5	362.5	358.0	361.0	358.4	358.4	352.0	356.3
30	366.5	362.5	362.1	363.7	358.4	358.4	354.0	356.9
31	...	...	...	...	...	...	...	...
Mean	365.6	365.7	358.0	363.2	359.0	359.4	352.5	357.1

TABLE 1. (Contd.)

	December							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	370.6	362.5	354.0	362.4	358.4	362.5	348.0	356.3
2	378.7	358.4	352.0	363.0	362.5	358.4	348.0	356.3
3	362.5	366.5	356.0	361.7	354.3	362.5	350.0	355.6
4	358.4	366.5	356.0	360.3	350.2	366.5	348.0	354.9
5	370.6	370.6	354.0	365.1	354.3	370.6	348.0	357.6
6	374.7	366.5	356.0	365.7	358.4	366.5	350.0	358.3
7	358.4	...	354.0	356.2	354.3	...	348.0	351.2
8	366.5	366.5	350.0	361.0	350.2	358.4	344.0	350.9
9	362.5	366.5	350.0	359.7	354.3	362.5	344.0	353.6
10	366.5	370.6	350.0	362.4	358.3	370.6	344.0	357.6
11	366.5	362.5	356.0	361.7	358.3	358.4	350.0	355.6
12	366.5	362.5	356.0	361.7	358.3	362.5	352.0	357.6
13	362.5	358.4	...	360.5	358.3	358.4	...	358.4
14	...	366.5	...	...	...	362.5	...	...
15	...	366.5	...	...	...	362.5	350.0	356.3
16	...	362.5	356.0	359.3	...	358.4	350.0	354.2
17	...	366.5	358.0	362.3	...	358.4	352.0	355.2
18	...	370.6	358.0	364.3	...	362.5	352.0	357.3
19	...	366.5	354.0	360.3	...	362.5	348.0	355.3
20	...	370.6	...	...	...	362.5	348.0	355.3
21	...	370.6	...	...	...	366.5	...	...
22	370.6	366.5	354.0	363.7	366.5	358.4	344.0	356.3
23	366.5	362.5	...	364.5	358.4	358.4	...	358.4
24	366.5	362.5	...	364.5	358.4	358.4	...	358.4
25	366.5	...	...	...	362.5	...	...	...
26	366.5	362.5	...	364.5	362.5	358.4	...	360.5
27	370.6	362.5	...	366.6	362.5	354.3	...	358.4
28	...	362.5	...	...	...	354.3	...	...
29	...	366.5	354.0	360.3	...	362.5	350.0	356.3
30	...	366.5	358.0	362.3	...	358.4	350.0	354.2
31	...	366.5	356.0	361.3	...	362.5	350.0	356.3
Mean	367.0	365.4	354.6	362.2	358.0	359.4	348.5	356.2

TABLE 2. Devils Kitchen Corrosion Array Statistical Flow Data.

Year	Mean, high daily flow, $\bar{X}$, pph	Standard deviation, high daily flow, σ, pph	Mean, low daily flow, $\bar{X}$, pph	Standard deviation, low daily flow, σ, pph
1980	363.68	4.18	356.04	4.22
1979	366.93	3.67	360.01	3.67
1978	371.82	5.29	364.08	5.29

The data in Table 2 are shown in the graph in Figure 3. The trend shows a definite small decrease in flow from 1978 through 1980 which could be the result of loss of flow due to deterioration of the thin-walled drum collector. If this is the case, flow will continue to decrease and replacement of the collector will be necessary. To do so will require removing the corrosion array from the site and bringing in an auger truck to redrill the shallow collector hole.

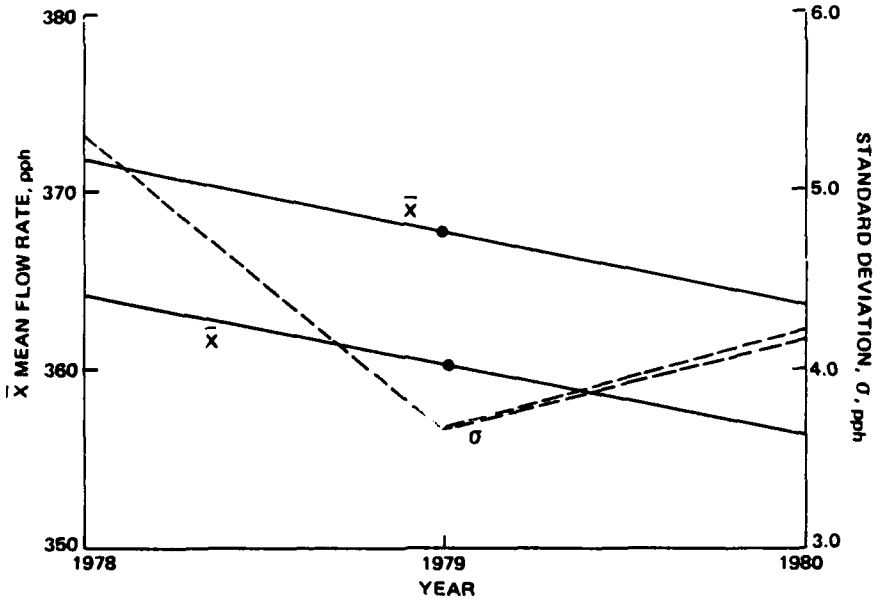


FIGURE 3. Devils Kitchen Corrosion Array Statistical Steam Flow Data.

Considering the data in Table 2, the range of flow varied from a high of 372 pph to a low of 356 pph during the three-year monitoring period. Taking the standard deviation associated with the high and low values, the expected range of flows at this site with a 3σ variation would be a high of 387.7 pph and a low of 343.4 pph.

The Devils Kitchen monitoring site is the most consistent of the steam flows being monitored at Coso and should be a reliable indicator of change in fumarole activity in the area.

COSO RESORT CORROSION ARRAY

The monitoring site near the Coso Resort, installed in February 1978, meters the flow from four shallow steam wells through a 50-inch water column differential pressure recorder and 1.97-inch diameter orifice plate combination. Variation in flow is greater at this site than at Devils Kitchen because of the longer steam flow lines and greater exposure to wind and ambient temperature variations, which tends to condense a larger fraction of the steam flow.

Table A-2 of Appendix A lists the high and low daily chart readings from the Coso resort corrosion array flow which are also illustrated in Figure 4. Statistical comparison of these data with the data from the previous reporting period is presented in Table 3.

The difference in means in the 1980 and 1978-79 data represents a variation of 93.6 pph of steam flow for both high and low mean flow readings. The range of flow expected from this monitoring site, assuming a 3-σ variation from the mean, is between 826.8 pph and 412.8 pph. which represents a difference in flow of 414 pph.

The statistical data of Table 3 is graphed in Figure 5. An increase in mean flow is seen in 1979 compared to the 1978 data and very little change in flow in the 1979/1980 period. A large drop in standard deviation (σ) of the mean flow for 1980 is noted indicating a decrease in variability of the flow during the 1980 reporting period. If flow variability at this site is primarily due to ambient temperature fluctuations a decrease in σ indicates less temperature variation than occurred in 1978 and 1979. Unfortunately, ambient temperature was not monitored prior to the installation of the Schober site in early 1981.

Table 4 lists the daily and monthly flows for the Coso corrosion site. The presentation of the data is in the same format as Table 1 and shows the comparison of the flows on the same date for the three years of data collected. The mean of the data is given for the same date for the three-year period as well as the monthly mean for each year and, also, the monthly mean of the means for the same date three-year period.

The monthly means from Table 4 can be compared to the annual mean flows in Table 3 with the differences due to seasonal variation in flow through the flow meter. The flow is higher than the annual mean in January through April and lower for the remainder of the year.

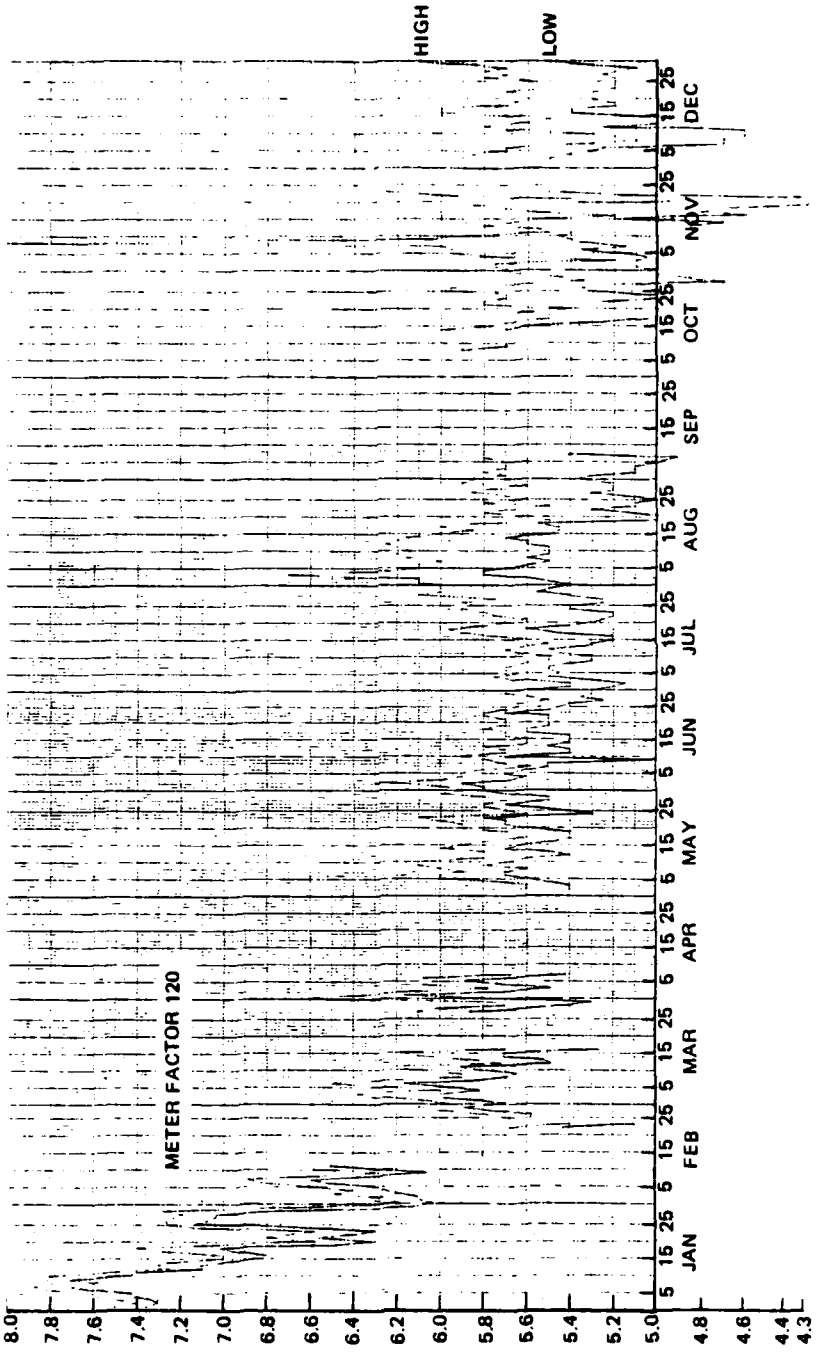


FIGURE 4. Coso Corrosion Array Steam Flow Meter Values, 1980.

TABLE 3. Coso Resort Corrosion Array Statistical Flow Data.

Year	Mean, high daily flow, $\bar{X}$, pph	Standard deviation, high daily flow, σ, pph	Mean, low daily flow, $\bar{X}$, pph	Standard deviation, low daily flow, σ, pph
1980	715.2	37.2	666.0	31.6
1979	710.4	74.4	679.2	69.6
1978	621.6	56.4	585.6	57.6

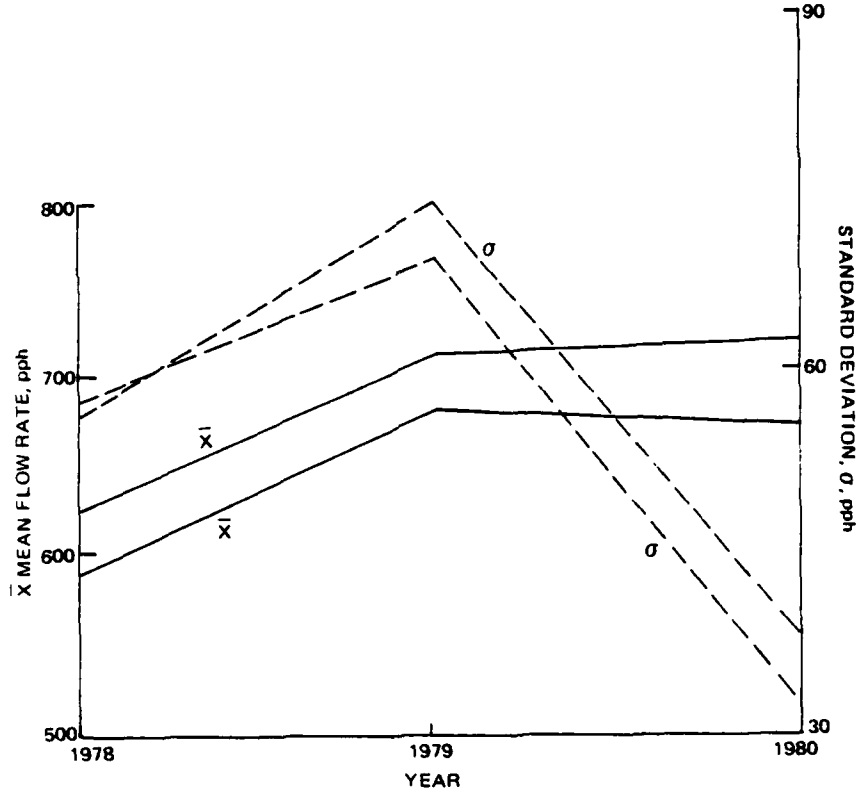


FIGURE 5. Coso Corrosion Array Statistical Steam Flow Data.

TABLE 4. Steam Flows at Coso Corrosion Array Site for 1978 Through 1980.

January								
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	516.0	900.0	708.0	...	456.0	882.0	669.0
2	...	516.0	888.0	702.0	...	492.0	876.0	684.0
3	...	552.0	896.4	724.2	...	516.0	879.6	697.8
4	...	564.0	909.6	736.8	...	516.0	890.4	703.2
5	...	588.0	912.0	750.0	...	552.0	891.6	721.8
6	...	588.0	934.8	761.4	...	540.0	912.0	726.0
7	...	552.0	944.4	748.2	...	516.0	924.0	720.0
8	...	552.0	934.8	743.4	...	504.0	909.6	706.8
9	...	564.0	963.6	763.8	...	504.0	925.2	714.6
10	...	564.0	960.0	762.0	...	492.0	891.6	691.8
11	...	...	900.0	...	...	...	888.0	...
12	...	...	870.0	...	...	...	852.0	...
13	...	...	876.0	...	...	...	853.2	...
14	...	...	870.0	...	...	...	840.0	...
15	...	...	840.0	...	...	...	818.4	...
16	...	...	840.0	...	...	...	817.2	...
17	...	...	870.0	...	...	...	834.0	...
18	...	564.0	888.0	726.0	...	540.0	842.0	691.0
19	...	528.0	846.0	687.0	...	468.0	782.4	625.2
20	...	516.0	789.6	652.8	...	468.0	758.4	613.2
21	...	588.0	816.0	702.0	...	516.0	787.2	651.6
22	...	600.0	801.6	700.8	...	540.0	768.0	654.0
23	...	588.0	789.6	688.8	...	528.0	756.0	642.0
24	...	660.0	852.0	759.0	...	576.0	792.0	684.0
25	...	660.0	871.2	768.6	...	552.0	855.6	703.8
26	...	552.0	871.2	711.6	...	480.0	849.6	664.8
27	...	576.0	867.6	721.8	...	480.0	844.8	662.4
28	...	588.0	862.8	725.4	...	504.0	843.6	673.8
29	...	...	873.6	...	...	...	800.4	...
30	...	...	800.4	...	...	...	735.6	...
31	...	...	744.0	...	...	...	724.8	...
Mean	...	570.3	870.4	725.9	...	511.4	839.6	681.0

TABLE 4. (Contd.)

	February							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	756.0	...	...	...	730.8	...
2	...	...	752.4	...	...	...	733.2	...
3	...	480.0	777.6	628.8	...	444.0	744.0	594.0
4	...	504.0	768.0	636.0	...	372.0	751.2	561.6
5	...	516.0	792.0	654.0	...	480.0	756.0	618.0
6	...	516.0	816.0	666.0	...	480.0	780.0	630.0
7	...	516.0	825.6	670.8	...	504.0	790.8	647.4
8	...	504.0	789.6	646.8	...	468.0	756.0	612.0
9	...	516.0	753.6	634.8	...	492.0	728.4	610.2
10	...	540.0	789.6	664.8	...	512.0	753.6	632.8
11	...	552.0	789.6	670.8	...	528.0	780.0	654.0
12	...	...	...	...	...	...	...	...
13	...	...	...	...	...	...	...	...
14	...	...	696.0	...	...	...	696.0	...
15	...	...	696.0	...	...	...	696.0	...
16	...	...	...	...	...	...	...	...
17	...	...	...	...	...	...	...	...
18	...	...	...	...	...	...	...	...
19	...	660.0	...	...	...	636.0	...	...
20	...	684.0	...	...	...	636.0	...	...
21	...	708.0	...	...	...	672.0	...	...
22	...	672.0	681.6	676.8	...	648.0	651.6	649.8
23	...	660.0	648.0	657.0	...	588.0	612.0	600.0
24	552.0	588.0	...	570.0	528.0	552.0	...	540.0
25	552.0	648.0	681.6	627.2	528.0	576.0	669.6	591.2
26	600.0	684.0	696.0	660.0	552.0	624.0	669.6	615.2
27	600.0	648.0	720.0	656.0	576.0	660.0	685.2	640.4
28	612.0	732.0	732.0	692.0	576.0	648.0	706.8	643.6
29	...	...	717.6	...	...	...	684.0	...
30	...	...	...	...	...	...	...	...
31	...	...	...	...	...	...	...	...
Mean	583.2	596.2	743.9	550.7	552.0	553.7	718.7	615.0

TABLE 4. (Contd.)

	March							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	624.0	732.0	729.6	695.2	576.0	660.0	696.0	644.0
2	576.0	660.0	756.0	664.0	552.0	600.0	721.2	624.4
3	552.0	...	765.6	658.8	528.0	...	724.8	626.4
4	612.0	...	720.0	666.0	552.0	...	698.4	625.2
5	600.0	...	756.0	678.0	540.0	...	720.0	630.0
6	540.0	...	780.0	660.0	480.0	...	741.6	610.8
7	516.0	648.0	741.6	635.2	480.0	588.0	822.0	630.0
8	576.0	672.0	708.0	652.0	516.0	648.0	684.0	616.0
9	624.0	672.0	708.0	668.0	576.0	624.0	678.0	626.0
10	624.0	624.0	735.6	661.2	600.0	576.0	696.0	624.0
11	660.0	624.0	744.0	676.0	624.0	588.0	708.0	640.0
12	672.0	660.0	686.4	672.8	600.0	624.0	658.8	627.6
13	600.0	636.0	700.8	645.6	564.0	612.0	663.6	613.2
14	600.0	612.0	732.0	648.0	564.0	588.0	685.2	612.4
15	564.0	684.0	741.6	663.2	540.0	612.0	684.0	612.0
16	588.0	684.0	684.0	652.0	552.0	672.0	632.4	618.8
17	624.0	684.0	...	654.0	576.0	648.0	...	612.0
18	648.0	696.0	...	672.0	612.0	648.0	...	630.0
19	672.0	708.0	...	690.0	648.0	696.0	...	672.0
20	672.0	...	...	...	636.0	...	...	...
21	...	...	...	...	...	...	...	...
22	...	...	...	...	...	...	...	...
23	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	...
25	...	...	...	...	...	...	...	...
26	...	...	...	...	...	...	...	...
27	...	...	732.0	...	...	...	703.2	...
28	...	...	722.4	...	...	...	678.0	...
29	...	...	684.0	...	...	...	648.0	...
30	672.0	...	691.2	681.6	648.0	...	637.2	642.6
31	720.0	...	793.2	756.6	672.0	...	696.0	684.0
Mean	615.3	666.4	729.1	669.1	574.4	625.6	694.1	629.6

TABLE 4. (Contd.)

	April							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	708.0	...	768.0	738.0	684.0	...	739.2	711.6
2	696.0	...	732.0	714.0	648.0	...	684.0	666.0
3	648.0	696.0	693.6	679.2	624.0	672.0	660.0	652.0
4	672.0	708.0	729.6	703.2	636.0	672.0	681.6	663.2
5	648.0	744.0	722.4	704.8	600.0	696.0	705.6	667.2
6	684.0	756.0	729.6	723.2	660.0	732.0	681.6	691.2
7	696.0	744.0	681.6	707.2	648.0	708.0	650.4	668.8
8	660.0	756.0	...	708.0	636.0	720.0	...	678.0
9	660.0	792.0	...	726.0	600.0	756.0	...	678.0
10	612.0	768.0	...	690.0	588.0	756.0	...	672.0
11	648.0	768.0	...	708.0	612.0	720.0	...	666.0
12	660.0	720.0	...	690.0	648.0	648.0	...	666.0
13	672.0	744.0	...	708.0	648.0	708.0	...	678.0
14	660.0	744.0	...	702.0	636.0	720.0	...	678.0
15	684.0	756.0	...	720.0	636.0	720.0	...	678.0
16	636.0	780.0	...	708.0	576.0	744.0	...	660.0
17	600.0	780.0	...	690.0	576.0	756.0	...	666.0
18	...	756.0	...	...	...	720.0	...	...
19	660.0	720.0	...	690.0	636.0	696.0	...	666.0
20	696.0	732.0	...	714.0	648.0	708.0	...	678.0
21	684.0	756.0	...	720.0	636.0	732.0	...	684.0
22	648.0	768.0	...	708.0	624.0	744.0	...	684.0
23	648.0	768.0	...	708.0	624.0	744.0	...	684.0
24	...	756.0	...	...	...	732.0	...	...
25	...	744.0	...	...	...	720.0	...	...
26	...	756.0	...	...	...	732.0	...	...
27	660.0	744.0	...	702.0	636.0	720.0	...	678.0
28	684.0	756.0	...	720.0	636.0	732.0	...	684.0
29	696.0	768.0	...	732.0	672.0	744.0	...	708.0
30	720.0	792.0	...	756.0	684.0	756.0	...	720.0
31	...	...	...	...	...	...	...	...
Mean	667.0	724.3	722.4	710.4	632.8	723.0	686.9	677.9

TABLE 4. (Contd.)

	May							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	720.0	804.0	...	762.0	660.0	768.0	...	714.0
2	708.0	768.0	672.0	716.0	660.0	732.0	648.0	680.0
3	732.0	...	672.0	702.0	684.0	...	648.0	666.0
4	744.0	...	684.0	714.0	648.0	...	660.0	654.0
5	732.0	780.0	720.0	744.0	684.0	756.0	672.0	704.0
6	684.0	804.0	720.0	736.0	648.0	780.0	684.0	704.0
7	660.0	792.0	708.0	720.0	624.0	768.0	684.0	692.0
8	672.0	780.0	720.0	724.0	636.0	756.0	672.0	688.0
9	708.0	756.0	732.0	732.0	660.0	708.0	708.0	692.0
10	696.0	...	732.0	714.0	660.0	...	696.0	678.0
11	672.0	...	696.0	684.0	636.0	...	672.0	654.0
12	660.0	...	672.0	666.0	624.0	...	648.0	636.0
13	708.0	744.0	696.0	716.0	660.0	720.0	660.0	680.0
14	708.0	756.0	720.0	728.0	684.0	720.0	684.0	696.0
15	732.0	756.0	708.0	732.0	708.0	732.0	672.0	704.0
16	696.0	756.0	696.0	716.0	648.0	732.0	660.0	680.0
17	684.0	744.0	672.0	700.0	648.0	720.0	648.0	672.0
18	684.0	744.0	672.0	700.0	660.0	720.0	648.0	676.0
19	696.0	768.0	684.0	716.0	660.0	732.0	648.0	680.0
20	720.0	756.0	708.0	728.0	684.0	732.0	672.0	684.0
21	732.0	732.0	708.0	724.0	708.0	696.0	684.0	696.0
22	756.0	732.0	720.0	736.0	720.0	696.0	684.0	700.0
23	744.0	732.0	732.0	736.0	708.0	708.0	696.0	704.0
24	732.0	744.0	672.0	716.0	696.0	720.0	696.0	704.0
25	720.0	732.0	684.0	712.0	696.0	708.0	600.0	668.0
26	696.0	756.0	696.0	716.0	672.0	720.0	672.0	688.0
27	672.0	768.0	696.0	712.0	648.0	732.0	684.0	688.0
28	684.0	756.0	684.0	708.0	648.0	732.0	660.0	680.0
29	...	744.0	696.0	720.0	...	708.0	660.0	684.0
30	...	732.0	720.0	726.0	...	708.0	684.0	696.0
31	...	720.0	660.0	690.0	...	696.0	696.0	696.0
Mean	705.4	756.0	698.4	717.6	666.9	726.9	670.0	685.1

TABLE 4. (Contd.)

June								
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	720.0	720.0	720.0	...	696.0	696.0	696.0
2	...	720.0	756.0	738.0	...	696.0	708.0	702.0
3	660.0	732.0	720.0	704.0	636.0	708.0	684.0	676.0
4	660.0	...	696.0	678.0	636.0	...	672.0	654.0
5	660.0	...	708.0	684.0	636.0	...	684.0	660.0
6	648.0	780.0	696.0	708.0	612.0	732.0	672.0	672.0
7	660.0	756.0	672.0	696.0	612.0	696.0	660.0	656.0
8	648.0	696.0	684.0	676.0	624.0	672.0	660.0	652.0
9	672.0	672.0	696.0	680.0	636.0	648.0	600.0	628.0
10	684.0	696.0	708.0	696.0	660.0	660.0	684.0	668.0
11	660.0	696.0	684.0	680.0	624.0	660.0	648.0	644.0
12	636.0	696.0	684.0	672.0	612.0	672.0	648.0	644.0
13	648.0	696.0	696.0	680.0	612.0	684.0	660.0	652.0
14	648.0	720.0	672.0	680.0	636.0	696.0	648.0	660.0
15	660.0	720.0	672.0	684.0	624.0	684.0	780.0	692.7
16	636.0	744.0	684.0	688.0	612.0	708.0	648.0	656.0
17	612.0	732.0	684.0	676.0	588.0	684.0	672.0	648.0
18	624.0	684.0	696.0	668.0	600.0	648.0	672.0	640.0
19	624.0	660.0	684.0	656.0	588.0	624.0	660.0	624.0
20	624.0	672.0	684.0	660.0	600.0	636.0	660.0	632.0
21	624.0	672.0	684.0	660.0	588.0	636.0	660.0	628.0
22	624.0	672.0	696.0	664.0	600.0	648.0	660.0	636.0
23	600.0	672.0	696.0	656.0	588.0	648.0	684.0	640.0
24	624.0	672.0	684.0	660.0	588.0	648.0	660.0	632.0
25	648.0	660.0	678.0	662.0	588.0	624.0	654.0	622.0
26	660.0	672.0	678.0	670.0	636.0	624.0	648.0	636.0
27	636.0	...	660.0	648.0	612.0	...	630.0	621.0
28	612.0	...	672.0	642.0	600.0	...	654.0	627.0
29	624.0	...	684.0	654.0	588.0	...	648.0	618.0
30	636.0	...	678.0	657.0	600.0	...	648.0	624.0
31	...	...	...	...	...	...	...	...
Mean	641.1	700.5	690.2	676.6	612.0	668.0	665.4	648.0

TABLE 4. (Contd.)

	July							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	648.0	...	648.0	648.0	612.0	...	624.0	618.0
2	648.0	...	648.0	648.0	624.0	...	618.0	571.0
3	648.0	...	678.0	663.0	624.0	...	636.0	630.0
4	636.0	...	690.0	663.0	612.0	...	660.0	636.0
5	636.0	...	678.0	657.0	624.0	...	654.0	639.0
6	636.0	...	684.0	660.0	612.0	...	660.0	636.0
7	636.0	...	684.0	660.0	612.0	...	660.0	636.0
8	624.0	648.0	672.0	648.0	600.0	624.0	648.0	624.0
9	648.0	...	660.0	654.0	612.0	...	636.0	624.0
10	660.0	...	660.0	660.0	624.0	...	636.0	630.0
11	672.0	...	678.0	675.0	636.0	...	654.0	645.0
12	648.0	...	684.0	666.0	624.0	...	660.0	642.0
13	636.0	...	672.0	654.0	612.0	...	642.0	627.0
14	636.0	...	660.0	648.0	612.0	...	636.0	624.0
15	660.0	...	672.0	666.0	624.0	...	624.0	624.0
16	672.0	...	690.0	681.0	648.0	...	624.0	636.0
17	672.0	648.0	708.0	676.0	648.0	612.0	654.0	638.0
18	660.0	672.0	714.0	682.0	636.0	636.0	672.0	648.0
19	660.0	684.0	696.0	680.0	624.0	648.0	648.0	640.0
20	672.0	660.0	684.0	672.0	636.0	648.0	636.0	640.0
21	660.0	...	672.0	666.0	624.0	...	630.0	627.0
22	648.0	...	690.0	669.0	624.0	...	624.0	624.0
23	660.0	684.0	696.0	680.0	624.0	648.0	624.0	632.0
24	648.0	684.0	708.0	680.0	588.0	660.0	648.0	632.0
25	624.0	...	702.0	663.0	600.0	...	648.0	624.0
26	648.0	...	708.0	678.0	600.0	...	630.0	615.0
27	660.0	...	690.0	675.0	636.0	...	630.0	633.0
28	660.0	...	732.0	696.0	636.0	...	648.0	642.0
29	648.0	...	720.0	684.0	624.0	...	666.0	645.0
30	660.0	...	720.0	690.0	636.0	...	660.0	648.0
31	672.0	...	720.0	696.0	648.0	...	648.0	648.0
Mean	651.5	668.6	687.7	669.0	602.5	639.4	643.2	631.5

TABLE 4. (Contd.)

	August							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	672.0	696.0	732.0	700.0	636.0	696.0	660.0	664.0
2	660.0	720.0	732.0	704.0	624.0	684.0	672.0	660.0
3	648.0	720.0	804.0	724.0	624.0	696.0	696.0	672.0
4	648.0	...	750.0	699.0	600.0	...	696.0	648.0
5	636.0	...	732.0	684.0	600.0	...	684.0	642.0
6	636.0	696.0	732.0	688.0	600.0	672.0	672.0	648.0
7	636.0	708.0	720.0	688.0	600.0	672.0	660.0	644.0
8	648.0	...	738.0	693.0	624.0	...	672.0	648.0
9	660.0	...	744.0	702.0	624.0	...	660.0	642.0
10	660.0	...	738.0	699.0	612.0	...	660.0	636.0
11	660.0	...	744.0	702.0	636.0	...	660.0	648.0
12	648.0	708.0	750.0	702.0	612.0	684.0	672.0	656.0
13	648.0	720.0	744.0	704.0	624.0	684.0	672.0	660.0
14	636.0	708.0	738.0	694.0	600.0	684.0	684.0	656.0
15	636.0	696.0	720.0	684.0	600.0	672.0	660.0	644.0
16	660.0	708.0	702.0	690.0	624.0	684.0	654.0	654.0
17	648.0	...	720.0	684.0	612.0	...	654.0	633.0
18	612.0	...	696.0	654.0	576.0	...	666.0	621.0
19	624.0	...	660.0	642.0	588.0	...	600.0	594.0
20	624.0	732.0	672.0	676.0	576.0	708.0	600.0	628.0
21	636.0	732.0	696.0	688.0	588.0	708.0	612.0	636.0
22	648.0	768.0	684.0	700.0	612.0	708.0	636.0	652.0
23	636.0	780.0	660.0	692.0	600.0	744.0	612.0	652.0
24	624.0	792.0	696.0	704.0	588.0	768.0	612.0	656.0
25	624.0	804.0	672.0	700.0	588.0	780.0	600.0	656.0
26	624.0	804.0	684.0	704.0	600.0	780.0	612.0	664.0
27	624.0	804.0	702.0	710.0	600.0	768.0	636.0	668.0
28	612.0	816.0	690.0	706.0	576.0	792.0	624.0	664.0
29	636.0	804.0	672.0	704.0	600.0	792.0	624.0	672.0
30	636.0	792.0	708.0	712.0	612.0	768.0	624.0	668.0
31	636.0	792.0	702.0	710.0	600.0	768.0	642.0	670.0
Mean	639.9	750.0	714.0	694.9	605.0	723.3	648.0	650.2

TABLE 4. (Contd.)

	September							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	624.0	792.0	684.0	700.0	576.0	768.0	636.0	660.0
2	600.0	768.0	696.0	688.0	576.0	744.0	612.0	644.0
3	612.0	...	684.0	648.0	576.0	...	612.0	594.0
4	624.0	780.0	684.0	696.0	600.0	756.0	612.0	656.0
5	624.0	756.0	684.0	688.0	600.0	732.0	600.0	644.0
6	624.0	744.0	696.0	688.0	600.0	720.0	588.0	636.0
7	612.0	756.0	...	684.0	588.0	732.0	648.0	656.0
8	600.0	756.0	...	678.0	564.0	732.0	...	648.0
9	600.0	756.0	...	678.0	576.0	744.0	...	660.0
10	624.0	756.0	...	690.0	588.0	744.0	...	666.0
11	612.0	756.0	...	684.0	564.0	732.0	...	648.0
12	600.0	732.0	...	666.0	564.0	708.0	...	636.0
13	600.0	744.0	...	672.0	552.0	720.0	...	636.0
14	600.0	732.0	...	666.0	552.0	708.0	...	630.0
15	552.0	720.0	...	636.0	516.0	696.0	...	606.0
16	600.0	732.0	...	666.0	540.0	696.0	...	618.0
17	648.0	732.0	...	690.0	588.0	720.0	...	654.0
18	588.0	732.0	...	660.0	528.0	708.0	...	618.0
19	528.0	756.0	...	642.0	504.0	720.0	...	612.0
20	528.0	756.0	...	642.0	504.0	732.0	...	618.0
21	576.0	744.0	...	660.0	528.0	732.0	...	630.0
22	552.0	732.0	...	642.0	528.0	720.0	...	624.0
23	552.0	732.0	...	642.0	504.0	708.0	...	606.0
24	564.0	732.0	...	648.0	528.0	708.0	...	618.0
25	576.0	732.0	...	654.0	540.0	696.0	...	618.0
26	576.0	732.0	...	654.0	552.0	708.0	...	630.0
27	576.0	744.0	...	660.0	540.0	720.0	...	630.0
28	576.0	732.0	...	654.0	540.0	708.0	...	624.0
29	576.0	720.0	...	648.0	540.0	696.0	...	618.0
30	576.0	732.0	...	654.0	540.0	708.0	...	624.0
31	...	...	...	...	...	...	...	...
Mean	590.0	744.4	688.0	665.9	553.2	717.5	615.4	632.1

TABLE 4. (Contd.)

	October							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	576.0	720.0	...	648.0	552.0	708.0	...	630.0
2	576.0	720.0	...	648.0	552.0	708.0	...	630.0
3	588.0	720.0	...	654.0	552.0	696.0	...	624.0
4	576.0	720.0	...	648.0	552.0	696.0	...	624.0
5	576.0	732.0	...	654.0	540.0	696.0	...	618.0
6	564.0	756.0	...	660.0	528.0	720.0	...	624.0
7	576.0	768.0	...	672.0	540.0	744.0	...	642.0
8	564.0	732.0	708.0	668.0	540.0	708.0	684.0	644.0
9	552.0	720.0	...	636.0	528.0	708.0	...	618.0
10	540.0	720.0	...	630.0	504.0	684.0	...	594.0
11	576.0	756.0	...	666.0	528.0	720.0	...	624.0
12	576.0	756.0	...	666.0	552.0	744.0	...	648.0
13	552.0	768.0	...	660.0	516.0	756.0	...	636.0
14	540.0	744.0	720.0	668.0	504.0	720.0	684.0	636.0
15	576.0	732.0	696.0	668.0	528.0	708.0	672.0	636.0
16	600.0	744.0	684.0	676.0	576.0	696.0	636.0	636.0
17	588.0	768.0	660.0	672.0	540.0	732.0	612.0	628.0
18	552.0	780.0	660.0	664.0	528.0	744.0	600.0	624.0
19	552.0	792.0	678.0	674.0	528.0	708.0	600.0	612.0
20	564.0	792.0	648.0	668.0	528.0	732.0	600.0	620.0
21	600.0	744.0	696.0	680.0	564.0	684.0	...	624.0
22	564.0	696.0	696.0	652.0	516.0	672.0	630.0	606.0
23	552.0	720.0	684.0	652.0	516.0	696.0	600.0	604.0
24	...	744.0	684.0	714.0	...	708.0	600.0	654.0
25	...	744.0	720.0	732.0	...	720.0	636.0	678.0
26	...	780.0	714.0	747.0	...	696.0	642.0	669.0
27	540.0	744.0	666.0	650.0	516.0	696.0	624.0	612.0
28	552.0	768.0	642.0	654.0	516.0	732.0	564.0	604.0
29	588.0	744.0	654.0	662.0	552.0	696.0	582.0	610.0
30	588.0	...	678.0	633.0	528.0	...	600.0	564.0
31	528.0	744.0	684.0	652.0	480.0	720.0	612.0	604.0
Mean	567.0	745.6	682.7	665.4	532.3	711.6	621.0	625.1

TABLE 4. (Contd.)

November								
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	528.0	720.0	690.0	646.0	504.0	696.0	612.0	604.0
2	528.0	720.0	690.0	646.0	492.0	684.0	612.0	596.0
3	504.0	768.0	624.0	632.0	468.0	732.0	612.0	604.0
4	564.0	720.0	696.0	660.0	504.0	708.0	606.0	606.0
5	564.0	696.0	714.0	658.0	516.0	672.0	624.0	604.0
6	516.0	732.0	714.0	654.0	480.0	696.0	642.0	606.0
7	516.0	768.0	720.0	668.0	480.0	732.0	630.0	614.0
8	576.0	768.0	960.0	768.0	516.0	732.0	630.0	626.0
9	648.0	732.0	726.0	702.0	576.0	720.0	648.0	648.0
10	648.0	708.0	720.0	692.0	612.0	684.0	654.0	650.0
11	624.0	696.0	660.0	660.0	564.0	648.0	648.0	620.0
12	564.0	684.0	666.0	638.0	516.0	660.0	...	588.0
13	552.0	696.0	696.0	648.0	528.0	660.0	582.0	590.0
14	528.0	708.0	678.0	638.0	504.0	672.0	564.0	580.0
15	504.0	696.0	660.0	620.0	468.0	672.0	618.0	586.0
16	504.0	744.0	624.0	624.0	468.0	684.0	552.0	568.0
17	516.0	768.0	672.0	652.0	492.0	744.0	576.0	604.0
18	528.0	744.0	684.0	652.0	492.0	696.0	564.0	584.0
19	564.0	696.0	702.0	654.0	528.0	648.0	516.0	564.0
20	576.0	696.0	594.0	622.0	552.0	648.0	504.0	568.0
21	600.0	...	660.0	630.0	564.0	...	516.0	540.0
22	564.0	...	720.0	642.0	516.0	...	600.0	558.0
23	540.0	...	756.0	646.0	504.0	...	660.0	582.0
24	600.0	...	...	...	540.0	...	...	...
25	564.0	...	...	...	540.0	...	...	...
26	540.0	...	...	...	516.0	...	...	...
27	516.0	...	...	...	468.0	...	...	...
28	504.0	...	...	...	468.0	...	...	...
29	528.0	...	...	...	492.0	...	...	...
30	588.0	...	...	...	492.0	...	...	...
31	...	...	...	...	...	...	...	...
Mean	536.2	723.0	696.8	654.0	512.0	689.4	599.2	595.2

TABLE 4. (Contd.)

	December							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	648.0	696.0	...	672.0	588.0	648.0	...	618.0
2	600.0	720.0	...	660.0	504.0	648.0	...	576.0
3	504.0	...	708.0	606.0	456.0	...	660.0	558.0
4	588.0	...	702.0	645.0	456.0	...	648.0	552.0
5	624.0	...	684.0	654.0	576.0	...	636.0	606.0
6	600.0	...	684.0	642.0	516.0	...	630.0	573.0
7	...	...	642.0	...	...	...	564.0	...
8	...	...	612.0	...	...	...	564.0	...
9	...	...	624.0	...	...	...	552.0	...
10	...	...	636.0	...	...	...	552.0	...
11	528.0	...	684.0	606.0	492.0	...	576.0	534.0
12	528.0	...	696.0	612.0	504.0	...	630.0	567.0
13	516.0	...	672.0	594.0	492.0	...	600.0	546.0
14	...	...	660.0	...	...	...	576.0	...
15	...	...	684.0	...	...	...	600.0	...
16	...	864.0	720.0	792.0	...	828.0	648.0	738.0
17	...	888.0	720.0	804.0	...	852.0	648.0	750.0
18	...	876.0	684.0	780.0	...	840.0	624.0	732.0
19	...	912.0	680.0	796.0	...	864.0	624.0	744.0
20	...	...	...	...	...	...	636.0	...
21	...	...	...	...	...	...	...	...
22	...	...	684.0	...	...	...	636.0	...
23	...	...	660.0	...	...	...	600.0	...
24	...	...	660.0	...	...	...	600.0	...
25	...	...	672.0	...	...	...	600.0	...
26	...	...	696.0	...	...	...	612.0	...
27	...	...	684.0	...	...	...	630.0	...
28	...	...	696.0	...	...	...	624.0	...
29	564.0	...	684.0	624.0	540.0	...	612.0	576.0
30	528.0	...	702.0	615.0	468.0	...	636.0	552.0
31	468.0	888.0	732.0	696.0	408.0	876.0	660.0	648.0
Mean	558.0	834.9	680.1	674.9	500.0	793.7	613.5	616.9

With the present instrumentation installation at this site it is not possible to determine why the flow is varying through the flow meter. The meter was installed to measure flow through the corrosion array, which it does, but it does not measure the output flow from the four steam wells. The condensed phase exits the flow line through a steam trap upstream of the flow meter and is not being monitored, thus a material balance is not possible.

In order to obtain useful information from the Coso site either of the following actions may be taken.

1. Install insulation on the flow lines.

2. Monitor the condensed phase.

3. Move the flow meter upstream of the steam trap or install a new flow meter a few feet downstream of the four steam wells.

Action 1 and 3, in conjunction, would provide the best monitoring site, but would make all the data collected thus far more difficult to use. The installation of a second flow meter would preserve the value of the existing data and initiate the collection of a more useful data base. This action has been initiated by ordering a new flow meter to be installed near the four steam wells.

It is likely that wide swings in the flow rate at this site would go unnoticed due to the variability and wide range of the current data.

TWO-INCH STEAM WELL

The 2.0-inch well located at site 8 of Figure 1 on the south end of the Coso Fault is designated on recorder charts as Coso No. 2. This site is monitored for both steam flow and steam temperature and recorded with a Barton two-pen recorder. The instrument was installed in January 1980 and, therefore, previous flow history is not available with the exception of a few readings made with a manometer in the last quarter of 1979.

Chart readings are listed in Table A-3 of Appendix A for Coso No. 2 and illustrated in Figures 6 and 7. Statistical data for the site is listed in Table 5. The values given are the yearly means and standard deviations for steam flow and temperatures.

Daily flows and monthly means for the Coso No. 2 site are listed in Table 6. The seasonal variation of this flow shows a different pattern than the Devils Kitchen and Coso Corrosion Array flows in that the flow is highest from March through August. The other two sites show the higher flows in January and February. A possible explanation for this difference is that the flow at Coso No. 2 is only 140 pph and the 1-square-foot concrete pillar around the pipe acts as a heat radiator which condenses a larger fraction of the flow in winter than at other times of the year. The steam temperature data in Figure 7 tends to support this argument.

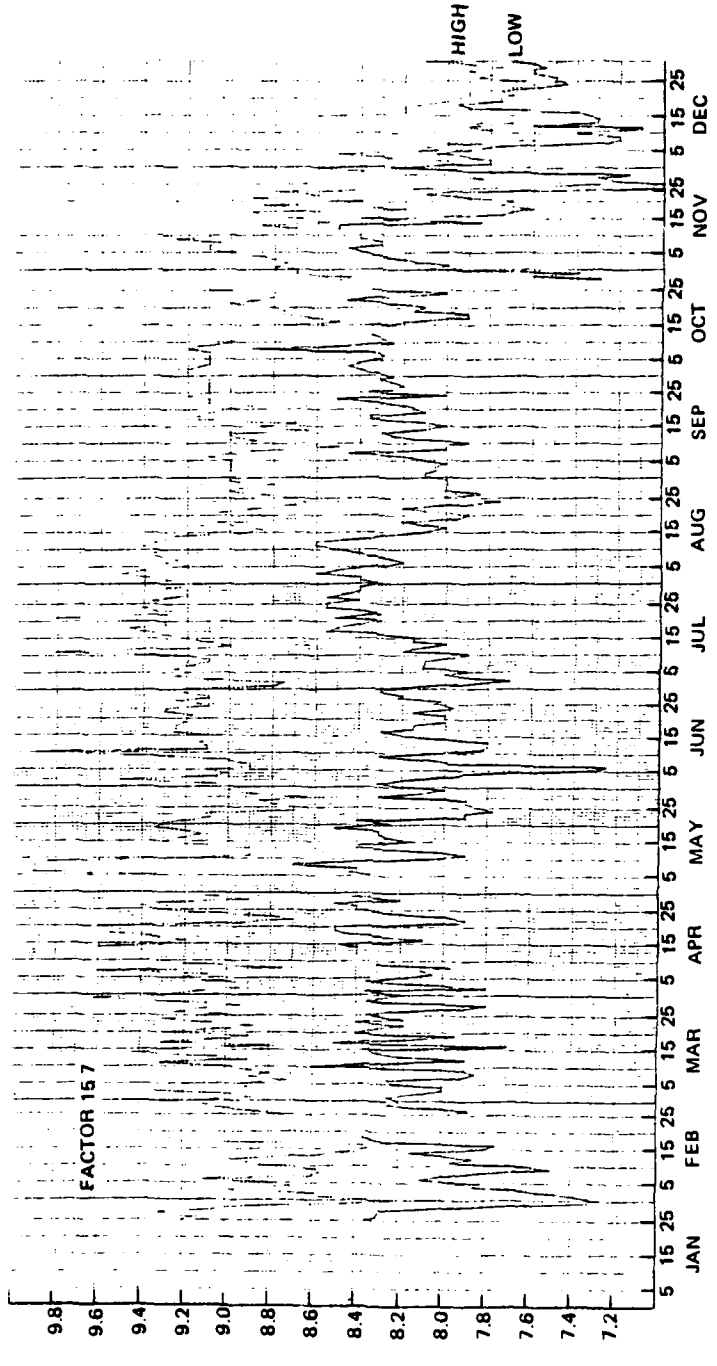


FIGURE 6. Coso No. 2 Steam Flow Meter Values, 1980.

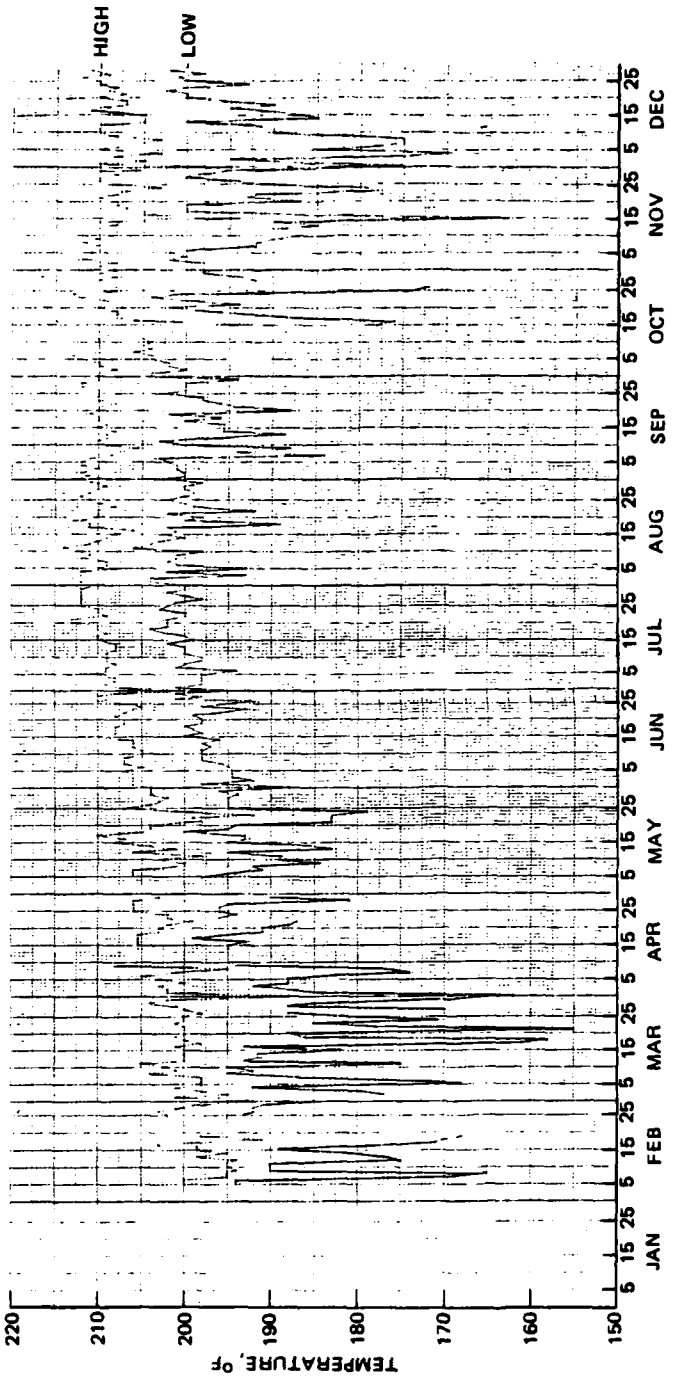


FIGURE 7. Coso No. 2 Steam Flow Temperatures, 1980.

TABLE 5. Two-Inch Steam Well Statistical Data.

Year	High flow standard deviation, pph		Low flow standard deviation, pph		High temperature standard deviation, °F		Low temperature standard deviation, °F	
	Mean	High flow	Mean	Low flow	Mean	High temp	Mean	Low temp
1980	139.6	7.65	126.0	5.3	208.0	4.0	191.3	9.1

EIGHT-INCH STOVE PIPE WELL AND SCHOBER'S RESORT

Instrumentation for continuous steam flow monitoring of these two sites was not available in 1980. Monitoring was attempted using occasional manual manometer readings. The data is presented in Figure 8. The trend seems to show an increase in manometer pressure (which represents flow) from January through June and then a rather sharp decline through November at the last reading. Note the similarity in form of the two flows which indicates that both these sites are vents to the same fracture. Distance between the two sites is approximately 3/8 of a mile.

Instrumentation is scheduled for installation at both these sites in the first quarter of 1981.

COSO MUD POT PHOTOGRAPHIC INVESTIGATION

A weekly photographic investigation was initiated in January 1978 to document the fluctuation in fluid levels in several of the more prominent mud pots at Coso, and will continue into the well production and power generation stages of geothermal development. This effort, together with the fluid level monitoring effort of the mud pots, will provide baseline data required to determine any effects of geothermal production on the Coso Hot Springs.

Figures 9 through 20 are photographs* showing monthly variations in fluid levels in four of the Coso mud pots. The complete photographic series is maintained by Code 266, NWC.

*A photographic series of the Coso mud pots taken from the same position each week. Photographs by E. Edwards, K. Danti, and D. Bowles, NWC.

TABLE 6. Steam Flow at Coso No. 2 Site for 1980.

January								
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...	...
10	...	...	...	...	...	...	...	...
11	...	...	...	...	...	...	...	...
12	...	...	...	...	...	...	...	...
13	...	...	...	...	...	...	...	...
14	...	...	...	...	...	...	...	...
15	...	...	...	...	...	...	...	...
16	...	...	...	...	...	...	...	...
17	...	...	...	...	...	...	...	...
18	...	...	...	...	...	...	...	...
19	...	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...	...
21	...	...	...	...	...	...	...	...
22	...	...	...	...	...	...	...	...
23	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	...
25	...	...	144.4	...	...	...	131.1	...
26	...	...	143.7	...	...	...	130.3	...
27	...	...	146.2	...	...	...	130.2	...
28	...	...	142.2	...	...	...	130.0	...
29	...	...	140.0	...	...	...	124.0	...
30	...	...	131.9	...	...	...	114.9	...
31	...	...	129.5	...	...	...	114.6	...
Mean	...	...	139.7	...	...	...	129.0	...

TABLE 6. (Contd.)

	February							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	134.4	...	...	...	115.9	...
2	...	...	134.9	...	...	...	117.8	...
3	...	...	141.3	...	...	...	120.1	...
4	...	...	136.6	...	...	...	123.2	...
5	...	...	138.5	...	...	...	122.8	...
6	...	...	143.0	...	...	...	127.2	...
7	...	...	133.6	...	...	...	125.6	...
8	...	...	134.5	...	...	...	122.9	...
9	...	...	134.7	...	...	...	117.8	...
10	...	...	138.6	...	...	...	119.6	...
11	...	...	139.7	...	...	...	125.0	...
12	...	...	141.0	...	...	...	123.6	...
13	...	...	134.9	...	...	...	125.6	...
14	...	...	132.7	...	...	...	128.0	...
15	...	...	131.3	...	...	...	122.5	...
16	...	...	130.6	...	...	...	121.7	...
17	...	...	141.3	...	...	...	129.5	...
18	...	...	141.0	...	...	...	131.3	...
19	...	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...	...
21	...	...	...	...	...	...	...	...
22	...	...	...	...	...	...	...	...
23	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	...
25	...	...	137.1	...	...	...	125.0	...
26	...	...	139.3	...	...	...	123.7	...
27	...	...	141.8	...	...	...	127.2	...
28	...	...	142.9	...	...	...	129.5	...
29	...	...	142.9	...	...	...	128.7	...
30	...	...	...	...	...	...	...	...
31	...	...	...	...	...	...	...	...
Mean	...	...	137.7	...	...	...	124.2	...

TABLE 6. (Contd.)

	March							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	139.4	...	...	...	129.5	...
2	...	...	141.3	...	...	...	127.3	...
3	...	...	146.5	...	...	...	125.6	...
4	...	...	139.9	...	...	...	125.6	...
5	...	...	140.2	...	...	...	129.2	...
6	...	...	137.1	...	...	...	129.5	...
7	...	...	139.4	...	...	...	124.2	...
8	...	...	138.2	...	...	...	123.2	...
9	...	...	139.7	...	...	...	124.0	...
10	...	...	141.3	...	...	...	135.0	...
11	...	...	146.0	...	...	...	130.3	...
12	...	...	...	...	...	...	...	...
13	...	...	...	...	...	...	...	...
14	...	...	148.1	...	...	...	130.3	...
15	...	...	147.6	...	...	...	131.1	...
16	...	...	138.2	...	...	...	120.9	...
17	...	...	146.0	...	...	...	133.5	...
18	...	...	141.3	...	...	...	128.7	...
19	...	...	139.7	...	...	...	124.8	...
20	...	...	146.0	...	...	...	131.9	...
21	...	...	141.3	...	...	...	130.3	...
22	...	...	139.7	...	...	...	128.7	...
23	...	...	142.9	...	...	...	131.1	...
24	...	...	146.0	...	...	...	128.7	...
25	...	...	141.3	...	...	...	131.1	...
26	...	...	145.2	...	...	...	129.5	...
27	...	...	143.7	...	...	...	124.0	...
28	...	...	140.5	...	...	...	122.5	...
29	...	...	145.2	...	...	...	131.1	...
30	...	...	151.0	...	...	...	130.3	...
31	...	...	146.0	...	...	...	128.7	...
Mean	...	...	142.7	...	...	...	128.3	...

TABLE 6. (Contd.)

	April							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	143.7	...	...	...	131.1	...
2	...	...	139.7	...	...	...	122.5	...
3	...	...	139.7	...	...	...	127.2	...
4	...	...	142.9	...	...	...	131.1	...
5	...	...	144.4	...	...	...	128.7	...
6	...	...	156.8	...	...	...	126.4	...
7	...	...	150.7	...	...	...	127.2	...
8	...	...	137.4	...	...	...	125.1	...
9	...	...	144.4	...	...	...	130.3	...
10	...	...	...	...	...	...	...	...
11	...	...	...	...	...	...	...	...
12	...	...	...	...	...	...	...	...
13	...	...	...	...	...	...	...	...
14	...	...	150.7	...	...	...	131.9	...
15	...	...	146.0	...	...	...	133.1	...
16	...	...	144.4	...	...	...	127.2	...
17	...	...	146.8	...	...	...	130.3	...
18	...	...	149.9	...	...	...	132.7	...
19	...	...	149.2	...	...	...	133.5	...
20	...	...	150.7	...	...	...	133.5	...
21	...	...	141.3	...	...	...	124.8	...
22	...	...	136.6	...	...	...	124.0	...
23	...	...	138.2	...	...	...	125.6	...
24	...	...	142.9	...	...	...	128.7	...
25	...	...	146.3	...	...	...	131.9	...
26	...	...	147.6	...	...	...	131.9	...
27	...	...	146.2	...	...	...	133.5	...
28	...	...	139.9	...	...	...	128.7	...
29	...	...	142.9	...	...	...	127.5	...
30	...	...	...	...	...	...	...	...
31	...	...	...	...	...	...	...	...
Mean	...	...	144.7	...	...	...	129.1	...

TABLE 6. (Contd.)

	May							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...
5	...	...	146.0	...	...	...	130.9	...
6	...	...	155.4	...	...	...	132.4	...
7	...	...	155.0	...	...	...	131.9	...
8	...	...	155.4	...	...	...	136.6	...
9	...	...	154.3	...	...	...	133.1	...
10	...	...	144.6	...	...	...	125.6	...
11	...	...	139.7	...	...	...	124.0	...
12	...	...	139.7	...	...	...	127.2	...
13	...	...	139.7	...	...	...	131.9	...
14	...	...	144.4	...	...	...	131.7	...
15	...	...	146.0	...	...	...	128.0	...
16	...	...	144.8	...	...	...	129.8	...
17	...	...	143.3	...	...	...	130.3	...
18	...	...	144.4	...	...	...	130.3	...
19	...	...	146.5	...	...	...	133.5	...
20	...	...	146.0	...	...	...	129.5	...
21	...	...	144.6	...	...	...	131.9	...
22	...	...	142.7	...	...	...	124.0	...
23	...	...	142.9	...	...	...	124.0	...
24	...	...	136.6	...	...	...	122.1	...
25	...	...	136.6	...	...	...	123.2	...
26	...	...	138.2	...	...	...	124.0	...
27	...	...	138.9	...	...	...	124.0	...
28	...	...	135.8	...	...	...	130.3	...
29	...	...	139.7	...	...	...	127.2	...
30	...	...	141.3	...	...	...	125.6	...
31	...	...	140.2	...	...	...	128.7	...
Mean	...	...	143.8	...	...	...	128.6	...

TABLE 6. (Contd.)

	June							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	143.2	...	...	...	130.5	...
2	...	...	149.2	...	...	...	128.7	...
3	...	...	143.8	...	...	...	124.8	...
4	...	...	141.5	...	...	...	124.2	...
5	...	...	142.9	...	...	...	114.6	...
6	...	...	139.7	...	...	...	113.8	...
7	...	...	139.7	...	...	...	124.8	...
8	...	...	141.6	...	...	...	127.2	...
9	...	...	145.7	...	...	...	130.3	...
10	...	...	155.3	...	...	...	125.6	...
11	...	...	142.9	...	...	...	122.8	...
12	...	...	142.9	...	...	...	122.5	...
13	...	...	143.3	...	...	...	122.5	...
14	...	...	142.9	...	...	...	125.9	...
15	...	...	142.9	...	...	...	128.7	...
16	...	...	145.4	...	...	...	130.3	...
17	...	...	145.2	...	...	...	128.0	...
18	...	...	...	...	...	...	...	...
19	...	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...	...
21	...	...	...	...	...	...	...	...
22	...	...	...	...	...	...	...	...
23	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	...
25	...	...	...	...	...	...	...	...
26	...	...	...	...	...	...	...	...
27	...	...	...	...	...	...	...	...
28	...	...	...	...	...	...	...	...
29	...	...	...	...	...	...	...	...
30	...	...	...	...	...	...	...	...
31	...	...	...	...	...	...	...	...
Mean	...	...	144.0	...	...	...	125.0	...

TABLE 6. (Contd.)

	July							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	138.2	...	...	...	124.8	...
2	...	...	137.4	...	...	...	120.9	...
3	...	...	142.9	...	...	...	123.2	...
4	...	...	145.2	...	...	...	125.6	...
5	...	...	144.4	...	...	...	124.0	...
6	...	...	145.2	...	...	...	127.2	...
7	...	...	144.4	...	...	...	127.2	...
8	...	...	142.9	...	...	...	127.2	...
9	...	...	142.9	...	...	...	125.6	...
10	...	...	144.4	...	...	...	124.0	...
11	...	...	153.9	...	...	...	128.7	...
12	...	...	144.4	...	...	...	128.0	...
13	...	...	141.3	...	...	...	125.6	...
14	...	...	142.9	...	...	...	128.0	...
15	...	...	144.4	...	...	...	128.0	...
16	...	...	146.0	...	...	...	130.3	...
17	...	...	147.6	...	...	...	134.2	...
18	...	...	148.4	...	...	...	133.5	...
19	...	...	146.0	...	...	...	131.9	...
20	...	...	146.0	...	...	...	130.3	...
21	...	...	153.9	...	...	...	133.5	...
22	...	...	146.0	...	...	...	131.9	...
23	...	...	146.0	...	...	...	130.3	...
24	...	...	147.6	...	...	...	144.2	...
25	...	...	146.8	...	...	...	134.2	...
26	...	...	146.8	...	...	...	131.9	...
27	...	...	146.0	...	...	...	134.2	...
28	...	...	144.4	...	...	...	132.7	...
29	...	...	144.4	...	...	...	131.9	...
30	...	...	146.0	...	...	...	131.9	...
31	...	...	143.7	...	...	...	130.3	...
Mean	...	...	145.2	...	...	...	129.2	...

TABLE 6. (Contd.)

	September							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	140.5	...	...	...	127.2	...
2	...	...	141.3	...	...	...	126.4	...
3	...	...	141.3	...	...	...	125.6	...
4	...	...	141.3	...	...	...	125.6	...
5	...	...	141.3	...	...	...	127.2	...
6	...	...	142.9	...	...	...	128.7	...
7	...	...	141.3	...	...	...	132.7	...
8	...	...	139.7	...	...	...	125.6	...
9	...	...	133.5	...	...	...	125.6	...
10	...	...	138.2	...	...	...	124.0	...
11	...	...	139.7	...	...	...	128.0	...
12	...	...	141.3	...	...	...	129.5	...
13	...	...	141.3	...	...	...	130.3	...
14	...	...	135.8	...	...	...	127.2	...
15	...	...	138.9	...	...	...	125.6	...
16	...	...	136.6	...	...	...	127.2	...
17	...	...	143.7	...	...	...	131.1	...
18	...	...	143.7	...	...	...	131.1	...
19	...	...	142.9	...	...	...	127.2	...
20	...	...	141.3	...	...	...	128.0	...
21	...	...	139.7	...	...	...	128.7	...
22	...	...	135.8	...	...	...	130.3	...
23	...	...	142.9	...	...	...	133.5	...
24	...	...	142.9	...	...	...	125.6	...
25	...	...	144.4	...	...	...	131.1	...
26	...	...	142.9	...	...	...	129.5	...
27	...	...	142.9	...	...	...	128.7	...
28	...	...	142.9	...	...	...	129.5	...
29	...	...	142.9	...	...	...	130.3	...
30	...	...	142.9	...	...	...	129.5	...
31	...	...	...	...	...	...	...	...
Mean	...	...	140.9	...	...	...	128.4	...

TABLE 6. (Contd.)

	October							
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	144.4	...	...	...	131.1	...
2	...	...	144.4	...	...	...	131.9	...
3	...	...	143.7	...	...	...	132.7	...
4	...	...	142.9	...	...	...	131.9	...
5	...	...	142.9	...	...	...	130.3	...
6	...	...	142.9	...	...	...	130.3	...
7	...	...	142.9	...	...	...	131.1	...
8	...	...	144.4	...	...	...	139.7	...
9	...	...	143.7	...	...	...	132.7	...
10	...	...	141.3	...	...	...	129.5	...
11	...	...	...	...	...	...	...	...
12	...	...	...	...	...	...	...	...
13	...	...	...	...	...	...	...	...
14	...	...	...	...	...	...	...	...
15	...	...	137.4	...	...	...	131.1	...
16	...	...	133.5	...	...	...	128.7	...
17	...	...	135.0	...	...	...	124.0	...
18	...	...	137.4	...	...	...	124.0	...
19	...	...	137.4	...	...	...	128.0	...
20	...	...	138.2	...	...	...	127.2	...
21	...	...	141.3	...	...	...	129.5	...
22	...	...	139.7	...	...	...	132.7	...
23	...	...	138.2	...	...	...	130.3	...
24	...	...	137.4	...	...	...	125.6	...
25	...	...	142.9	...	...	...	131.1	...
26	...	...	...	...	...	...	...	...
27	...	...	...	...	...	...	...	...
28	...	...	133.5	...	...	...	114.6	...
29	...	...	132.7	...	...	...	119.3	...
30	...	...	136.6	...	...	...	116.2	...
31	...	...	136.6	...	...	...	127.2	...
Mean	...	...	139.7	...	...	...	128.4	...

TABLE 6. (Contd.)

November								
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	138.2	...	...	...	125.6	...
2	...	...	137.4	...	...	...	128.0	...
3	...	...	138.2	...	...	...	128.7	...
4	...	...	138.9	...	...	...	131.1	...
5	...	...	141.3	...	...	...	131.9	...
6	...	...	142.9	...	...	...	132.7	...
7	...	...	142.9	...	...	...	130.3	...
8	...	...	142.1	...	...	...	130.3	...
9	...	...	145.2	...	...	...	131.9	...
10	...	...	142.9	...	...	...	131.9	...
11	...	...	...	...	...	...	...	...
12	...	...	136.6	...	...	...	133.5	...
13	...	...	138.9	...	...	...	133.5	...
14	...	...	134.2	...	...	...	123.2	...
15	...	...	136.6	...	...	...	131.9	...
16	...	...	138.9	...	...	...	121.7	...
17	...	...	139.7	...	...	...	120.9	...
18	...	...	128.7	...	...	...	119.3	...
19	...	...	138.9	...	...	...	121.7	...
20	...	...	131.9	...	...	...	120.9	...
21	...	...	139.7	...	...	...	124.0	...
22	...	...	135.0	...	...	...	128.7	...
23	...	...	138.2	...	...	...	127.2	...
24	...	...	125.6	...	...	...	109.9	...
25	...	...	114.6	...	...	...	109.9	...
26	...	...	117.8	...	...	...	113.1	...
27	...	...	123.2	...	...	...	114.6	...
28	...	...	126.4	...	...	...	112.3	...
29	...	...	131.9	...	...	...	124.0	...
30	...	...	135.0	...	...	...	129.5	...
31	...	...	...	...	...	...	...	...
Mean	...	...	135.3	...	...	...	124.9	...

TABLE 6. (Contd.)

December								
	High values, pph				Low values, pph			
	1978	1979	1980	Mean	1978	1979	1980	Mean
1	...	...	124.8	...	...	...	122.5	...
2	...	...	125.6	...	...	...	122.5	...
3	...	...	130.3	...	...	...	124.0	...
4	...	...	133.5	...	...	...	126.4	...
5	...	...	126.4	...	...	...	124.8	...
6	...	...	127.2	...	...	...	122.5	...
7	...	...	125.6	...	...	...	113.8	...
8	...	...	119.3	...	...	...	113.1	...
9	...	...	113.1	...	...	...	103.6	...
10	...	...	116.2	...	...	...	103.6	...
11	...	...	122.5	...	...	...	111.5	...
12	...	...	124.0	...	...	...	119.3	...
13	...	...	120.9	...	...	...	114.6	...
14	...	...	...	...	...	...	...	...
15	...	...	...	...	...	...	115.4	...
16	...	...	128.7	...	...	...	116.2	...
17	...	...	128.7	...	...	...	124.0	...
18	...	...	128.0	...	...	...	124.8	...
19	...	...	125.6	...	...	...	121.7	...
20	...	...	124.8	...	...	...	121.7	...
21	...	...	124.0	...	...	...	120.9	...
22	...	...	124.0	...	...	...	121.7	...
23	...	...	120.9	...	...	...	119.3	...
24	...	...	119.3	...	...	...	117.0	...
25	...	...	120.1	...	...	...	117.8	...
26	...	...	123.2	...	...	...	117.8	...
27	...	...	122.5	...	...	...	120.9	...
28	...	...	124.0	...	...	...	120.9	...
29	...	...	121.7	...	...	...	118.5	...
30	...	...	124.0	...	...	...	119.3	...
31	...	...	127.2	...	...	...	121.7	...
Mean	...	...	124.0	...	...	...	122.8	...

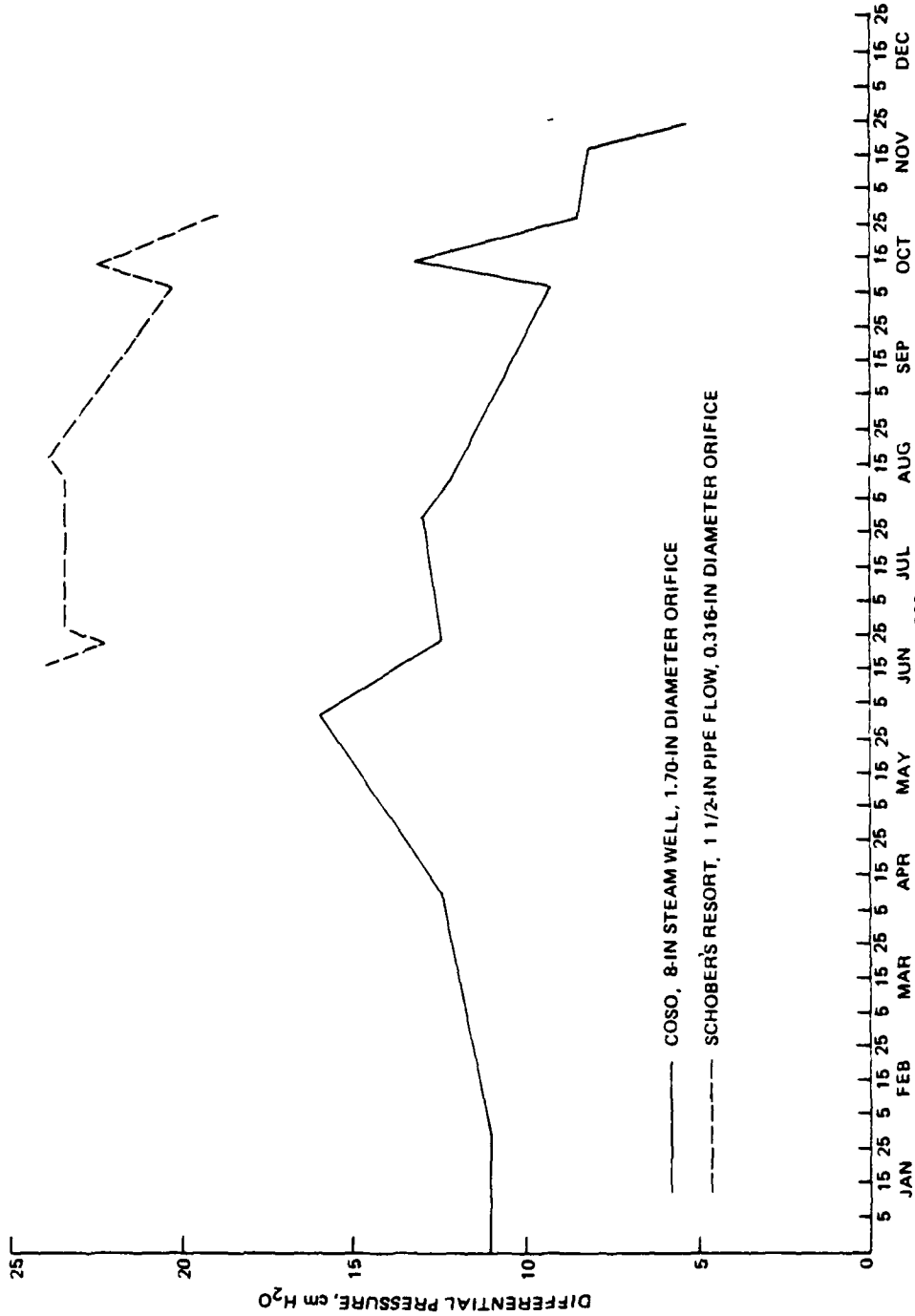


FIGURE 8. Steam Flow Monitoring at Coso With Manometer.

a. South pool

b. Gray mud pots

c. Red and gray pool

d. Brown mud pots

FIGURE 9. Coso Mud Pots 7 January 1980.

b. Gray mud pots

d. Brown mud pots

a. South pool

c. Red and gray pool

a. South pool

b. Gray mud pots

c. Red and gray pool

d. Brown mud pots

FIGURE 11. Coso Mud Pots 20 March 1980.

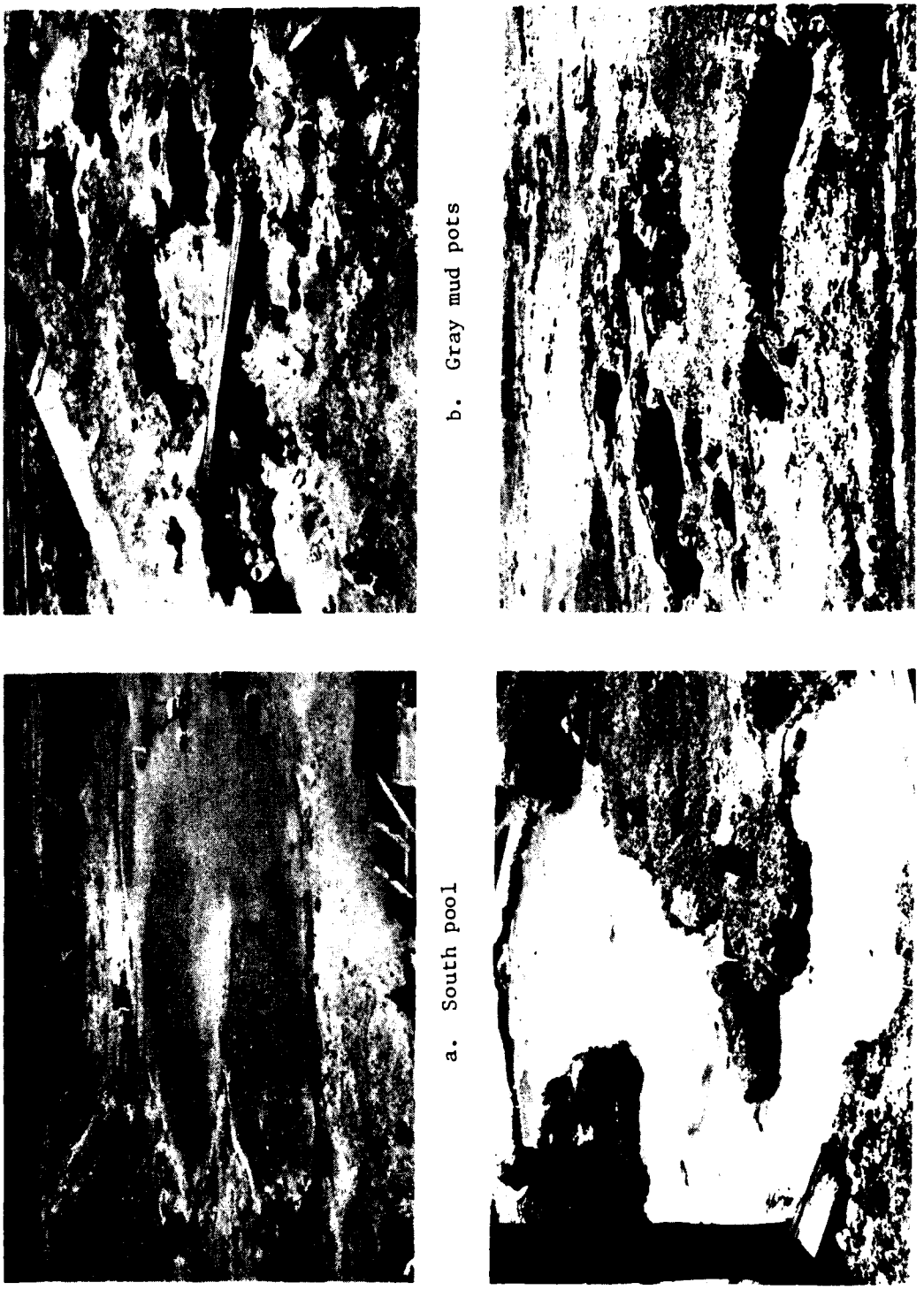
a. South pool

b. Gray mud pots

c. Red and gray pool

d. Brown mud pots

FIGURE 12. Coso Mud Pots 21 April 1980.



a. South pool

b. Gray mud pots

c. Red and gray pool

d. Brown mud pots

FIGURE 13. Coso Mud Pots 5 May 1980.

a. South pool

b. Gray mud pots

c. Red and gray pool

d. Brown mud pots

FIGURE 14. Coso Mud Pots 2 June 1980.

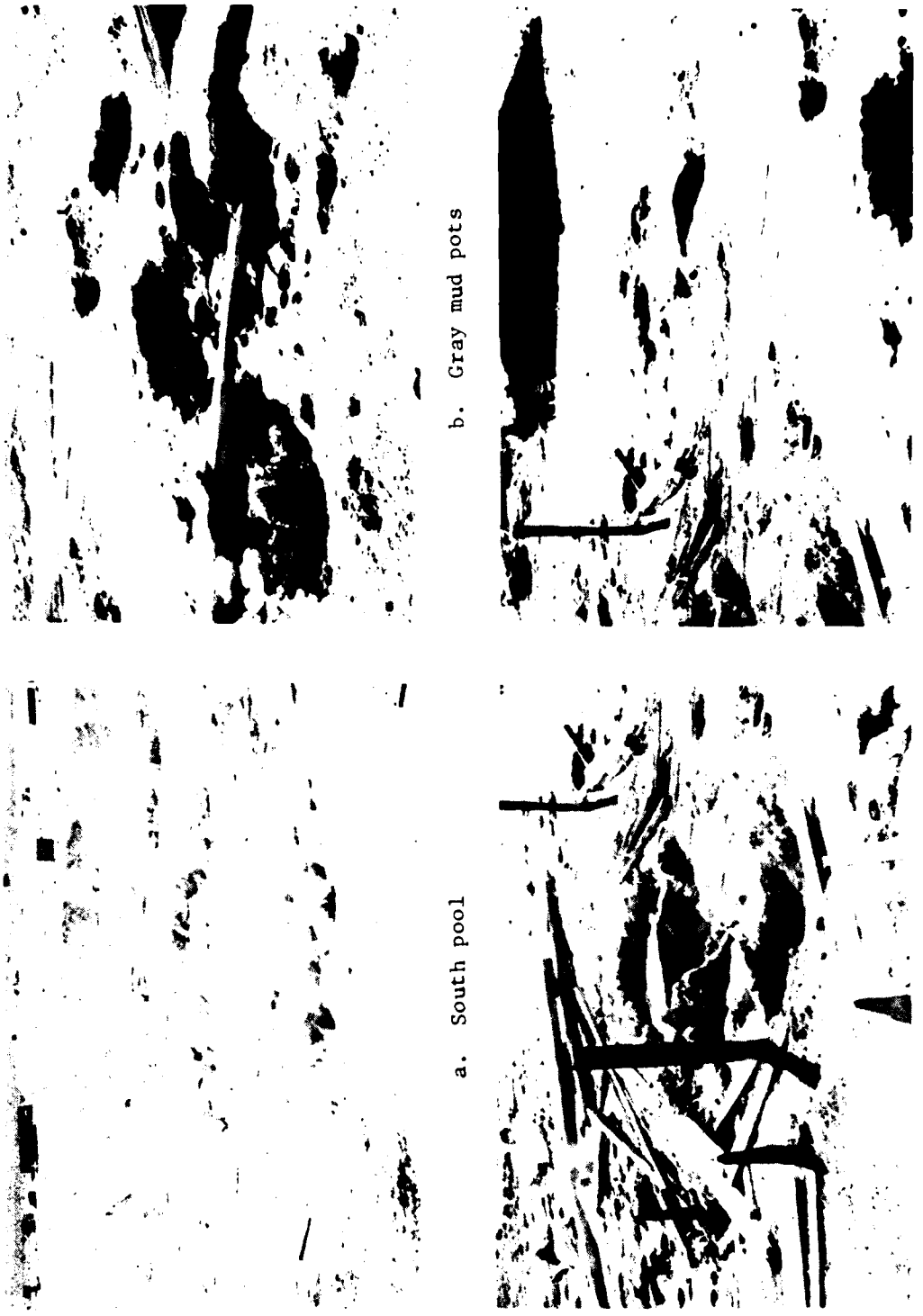
a. South pool

b. Gray mud pots

c. Red and gray pool

d. Brown mud pots

FIGURE 15. Coso Mud Pots 7 July 1980.



a. South pool

b. Gray mud pots

c. Red and gray pool

d. Brown mud pots

FIGURE 16. Coso Mud Pots 4 August 1980.

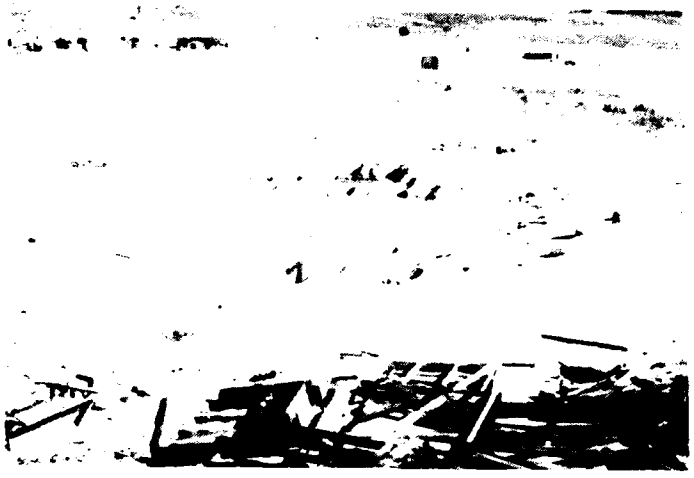
a. South pool

b. Gray mud pots

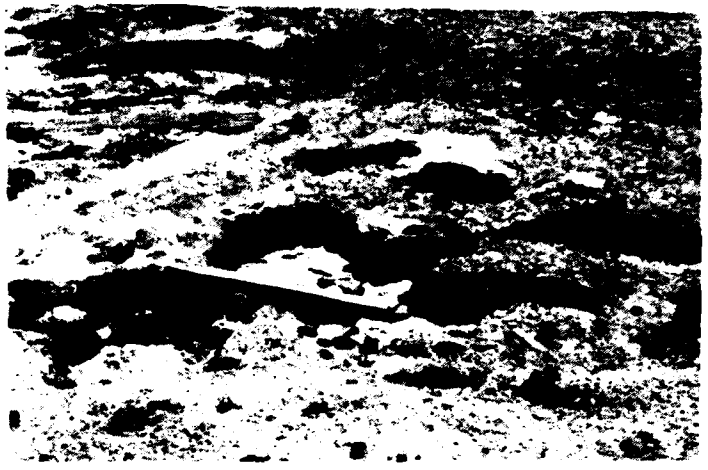
c. Red and gray pool

d. Brown mud pots

FIGURE 17. Coso Mud Pots 1 September 1980.



a. South pool



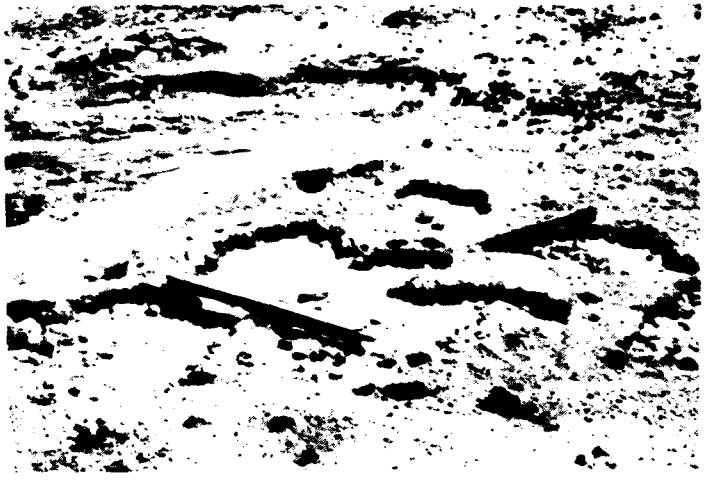
b. Gray mud pots

c. Red and gray pool

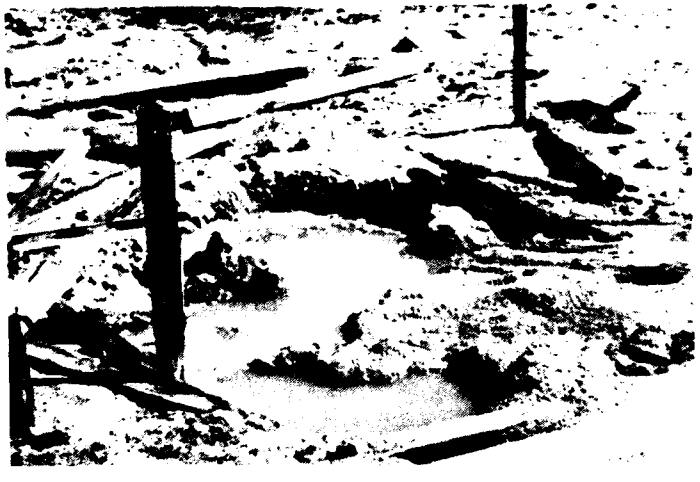
d. Brown mud pots

FIGURE 18. Coso Mud Pots in October 1980.

a. South pool



b. Gray mud pots

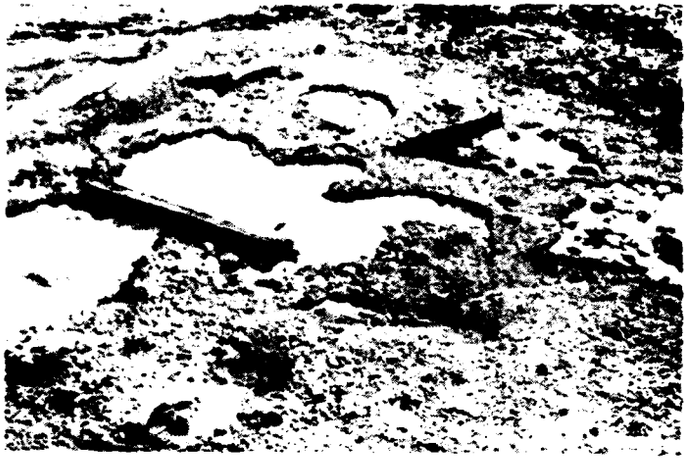


c. Red and gray pool

d. Brown mud pots

FIGURE 19. Geso Mud Pots 3 November 1980.

a. South pool



b. Gray mud pots

c. Red and gray pool

d. Brown mud pots

FIGURE 20. Coso Mud Pots 2 December 1980.

Three of the mud pots included in the photographic series are located in the fenced compound to the south of and adjacent to the main Coso Resort building. The red and gray pools are actually only one pool when it is half full of water but separates into two pools as the water level drops below half full. As boiling subsides the two pools occasionally take on two distinct colors, one red and the other gray. This pool is approximately 8- to 10-inches deep when full. (See Figures 9(c) through 20(c).)

Two of the mud pots in the photographic series, the gray mud pot and the brown mud pot, are positioned about 4 feet to the west of the red and gray pool. The depth of these two mud pots are about 4 to 6 inches and like the red and gray pool exhibit a low level of boiling activity.

The largest pool at Coso is the south pool (Figures 9(a) through 20(a)) located in a small area near the north bank. When full it covers an area of some 20 x 30 feet with a depth of 8 to 10 feet. This pool claimed the life of a young burro last October when the animal fell in, trying to drink, and was not able to extract itself from the hot water.

Water levels in the mud pots and pools are highest in January through March, which corresponds to the rainy season in the Coso Range, and fall to the lowest levels in June through August due to very high evaporation rates during this period. Water levels begin to rise again in September as more of the fumarole supplied steam condenses and evaporation rates decrease.

Rainfall is not a factor in the rising water levels at this time of year as there is little rain in the Coso area prior to mid-December. A heavy rain in the winter will increase the water level in the south pool a significant amount due to the large area of the former clay pit. A 5-inch rise in water level was recorded on 2 March 1981, due to a 1 1/4-inch rain on 1 March 1981.

WATER LEVEL MONITORING

Water levels are monitored in two Coso wells and three pools. The two wells are monitored with continuous float-activated water level recorders while the pools are monitored manually. In December 1980 a recorder was installed on the south pool, which is shown in Figure 21.

Coso Well 1

The manually gaged depth of the water in Coso Well 1 is 140 ± 1 foot with frequent, very fast, heaves of 3 to 4 feet upward. These heaves may be the result of large gas bubble (steam and CO_2) formation and expansion caused by buildup of pressure in the formation.

FIGURE 21. Monitoring Water Level in South Pool.

Monitoring the water level in Coso Well 1 with the water level recorder presents problems which were not anticipated when the recorder was installed. A heavily weighted float is necessary to prevent the recorder being violently thrown up the well bore and entangling the support line 5 to 10 feet above the water surface. The weighted float, with near neutral buoyancy, is being thrown 3 to 4 feet up the bore and then falls back well below the water surface. The result is that the recorder data are unrealiable and the data reported for water level in this well are periodic calibration readings which are etched on the instrument actuating tape and marked on the recorder chart manually.

Water depth of Coso Well 1 is plotted in Figure 22 from manual readings.

Coso Well 4P-1

Well 4P-1, located at Site 8 in Figure 1, is a hot, fresh water well with a depth of 103 feet. This well was rehabilitated in 1978 as a sampling site and equipped with a water level recorder in December 1979. The well, although hot, is very quiet compared to Coso Well 1 and recorder data are considered reliable. Figure 23, plotted from recorder data, shows a very constant water level at 70 feet.

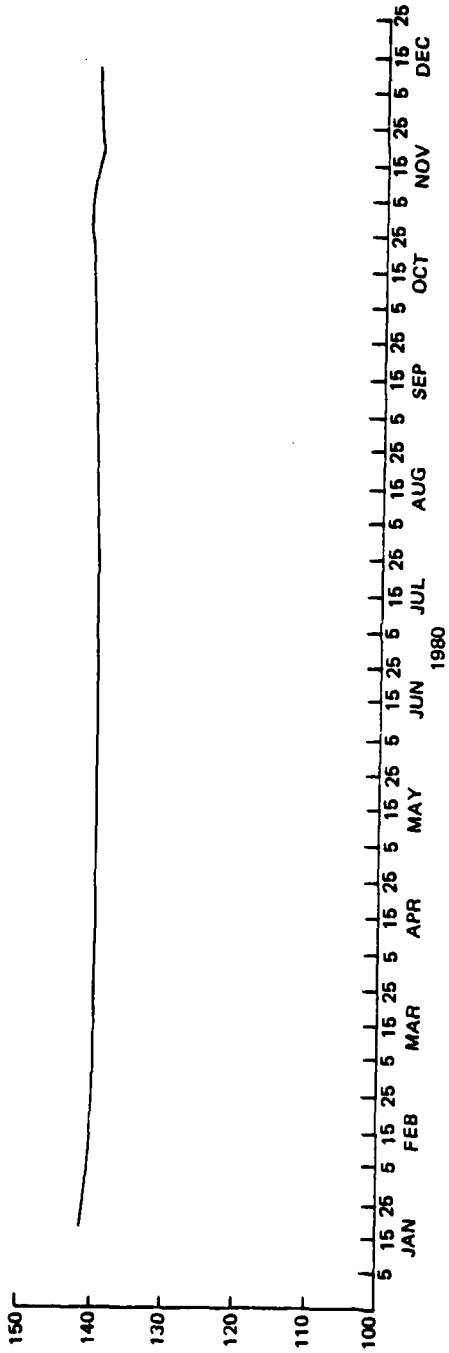


FIGURE 22. Coso Well 1 Water Level.

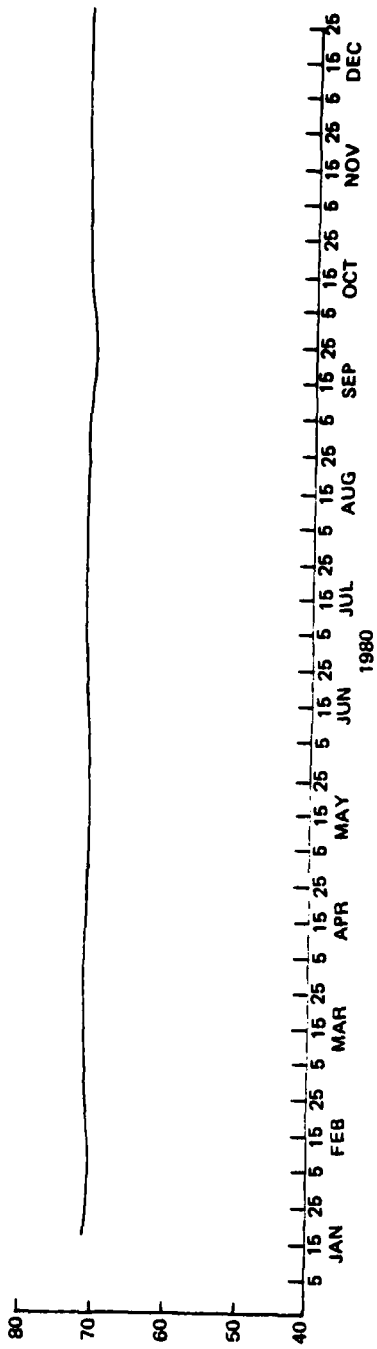


FIGURE 23. Well 4P-1 Water Level.

Fluid Level Monitoring

Fluid level monitoring of the mud pots was initiated in the last quarter of 1979 and includes two of the sites in the weekly photographic series. These are the red and gray pools, and the south pool. A third site being monitored is a rocked-in cistern 30 feet south of the red and gray pool.

The fluid level data for all three pools monitored are presented in Table 7 and plotted in Figure 24. These data show the variation in water depth from a reference point at the top of the cistern.

The fluid levels are higher during January through mid-March than in November and December due to the combined effects of the cold weather and late winter rains. After the rainy season the pools tend to dry up at about the same rate that they accumulate fluids in the fall. This indicates an evaporation/condensation effect.

TABLE 7. Elevation Data on Coso Pools.

Date Ambient air temp.	Pool designation	Relative elevation, feet	Change in elevation, feet
1/15/80	Red and gray pool	86.92	...
58° F	Cistern	86.64	...
	South pool	95.75	...
1/23/80	Red and gray pool	86.86	-0.06
59° F	Cistern	86.43	-0.21
	South pool	95.62	-0.13
1/29/80	Red and gray pool	86.96	+0.04
51° F	Cistern	86.63	-0.01
	South pool	95.98	+0.23
2/4/80	Red and gray pool	86.80	-0.12
66° F	Cistern	86.46	-0.18
	South pool	95.82	+0.07
2/25/80	Red and gray pool	86.85	-0.07
62° F	Cistern	86.57	-0.08
	South pool	96.31	+0.56
3/24/80	Red and gray pool	86.68	-0.24
58° F	Cistern	86.52	-0.12
	South pool	96.27	+0.52

TABLE 7. (Contd.)

Date Ambient air temp.	Pool designation	Relative elevation, feet	Change in elevation, feet
4/14/80 71° F	Red and gray pool	86.85	-0.07
	Cistern	86.35	-0.29
	South pool	95.94	+0.19
4/21/80 54° F	Red pool	86.71	-0.21
	Gray pool	86.79	-0.13
	Cistern	85.91	-0.73
	South pool	95.80	+0.05
5/5/80 77° F	Red pool	86.81	-0.11
	Gray pool	86.83	-0.09
	Cistern	86.08	-0.56
	South pool	95.43	-0.32
5/15/80 77° F	Red pool	86.60	-0.32
	Gray pool	86.58	-0.34
	Cistern	85.70	-0.94
	South pool	95.20	-0.55
5/28/80 64° F	Red pool	86.71	-0.21
	Gray pool	86.79	-0.13
	Cistern	85.68	-0.96
	South pool	95.00	-0.75
6/2/80 74° F	Red pool	86.73	-0.19
	Gray pool	86.81	-0.11
	Cistern	85.82	-0.82
	South pool	94.85	-0.90
6/9/80 84° F	Red pool	86.58	-0.34
	Gray pool	86.58	-0.34
	Cistern (dry)	85.30	-1.34
	South pool	94.60	-1.15
6/16/80 99° F	Red pool	86.50	-0.42
	Gray pool	86.40	-0.52
	Cistern (dry)	85.30	-1.34
	South pool	94.21	-1.54
7/14/80 92° F	Red pool (dry)	86.50	-0.42
	Gray pool (dry)	86.50	-0.42
	Cistern (dry)	85.30	-1.34
	South pool	92.89	-2.86

TABLE 7. (Contd.)

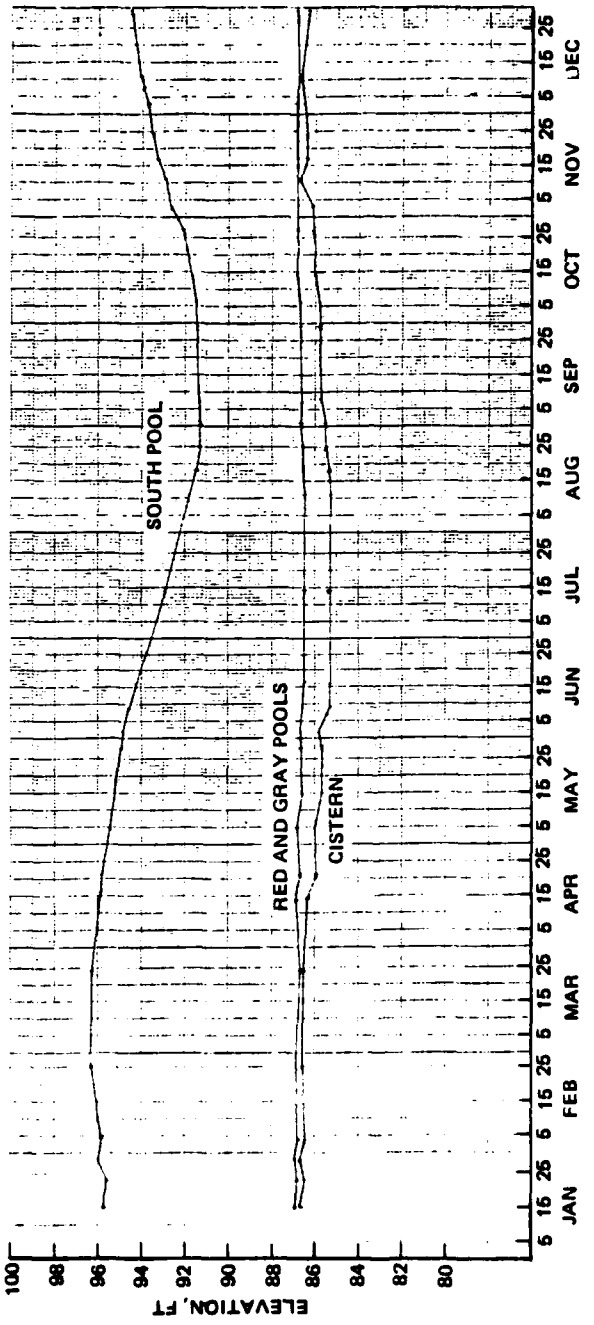
Date Ambient air temp.	Pool designation	Relative elevation, feet	Change in elevation, feet
8/11/80 106° F	Red pool (dry)	86.50	-0.42
	Gray pool (dry)	86.50	-0.42
	Cistern (dry)	85.30	-1.34
	South pool	91.80	-3.95
8/18/80 98° F	Red pool	86.50	-0.42
	Gray pool	86.50	-0.42
	Cistern	85.38	-1.26
	South pool	91.50	-4.25
8/25/80 95° F	Red pool	86.58	-0.34
	Gray pool	86.58	-0.34
	Cistern	85.46	-1.18
	South pool	91.30	-4.45
9/1/80 94° F	Red pool	86.67	-0.25
	Gray pool	86.67	-0.25
	Cistern	85.55	-1.09
	South pool	91.30	-4.45
9/7/80 83° F	Red pool	86.61	-0.31
	Gray pool	86.75	-0.17
	Cistern	85.71	-0.93
	South pool	91.36	-4.39
9/29/80 95° F	Red pool	86.70	-0.22
	Gray pool	86.70	-0.22
	Cistern	85.80	-0.84
	South pool	91.43	-4.32
10/6/80 88° F	Red pool	86.70	-0.22
	Gray pool	86.70	-0.22
	Cistern	85.81	-0.83
	South pool	91.54	-4.21
10/14/80 65° F	Red pool	86.81	-0.11
	Gray pool	86.81	-0.11
	Cistern	86.02	-0.62
	South pool	91.72	-4.03
10/27/80 71° F	Red pool	86.83	-0.09
	Gray pool	86.83	-0.09
	Cistern	86.14	-0.50
	South pool	92.15	-3.60

TABLE 7. (Contd.)

Date Ambient air temp.	Pool designation	Relative elevation, feet	Change in elevation, feet
11/3/80 90° F	Red pool	86.83	-0.09
	Gray pool	86.83	-0.09
	Cistern	86.19	-0.45
	South pool	92.66	-3.09
11/11/80 ...	Red pool	86.83	-0.09
	Gray pool	86.83	-0.09
	Cistern	86.73	-0.09
	South pool	92.93	-2.82
11/17/80 70° F	Red pool	86.88	-0.04
	Gray pool	86.88	-0.04
	Cistern	86.40	-0.24
	South pool	93.27	-2.48
11/24/80 59° F	Red pool	86.92	-0.00
	Gray pool	86.92	-0.00
	Cistern	86.41	-0.23
	South pool	93.47	-2.28
12/3/80 68° F	Red pool	86.87	-0.05
	Gray pool	86.87	-0.05
	Cistern	86.55	-0.09
	South pool	93.78	-1.97
12/11/80 ...	Red pool	86.80	-0.12
	Gray pool	86.80	-0.12
	Cistern	86.70	-0.06
	South pool	94.14	-1.61
12/30/80 74° F	Red pool	86.84	-0.08
	Gray pool	86.84	-0.08
	Cistern	86.33	-0.31
	South pool	94.54	-1.21

RAINFALL DATA AT COSO RESORT AND HAIWEE RESERVIOR

Rainfall in the Coso area is monitored at five sites shown on the map in Figure 25. Instrumentation at each site includes both battery-powered digital readout gauges and manual reading funnel gauges. The digital instruments have not proven reliable and therefore, the rainfall totals reported are from the manual readings.



NOTE: ELEVATIONS SHOWN ARE RELATIVE TO A BENCHMARK ESTABLISHED ON A CONCRETE SLAB ON THE WEST BANK OF THE COSO FAULT AND ARBITRARILY ASSIGNED AN ELEVATION OF 100 FEET.

FIGURE 24. Water Levels for Three Coso Pools.

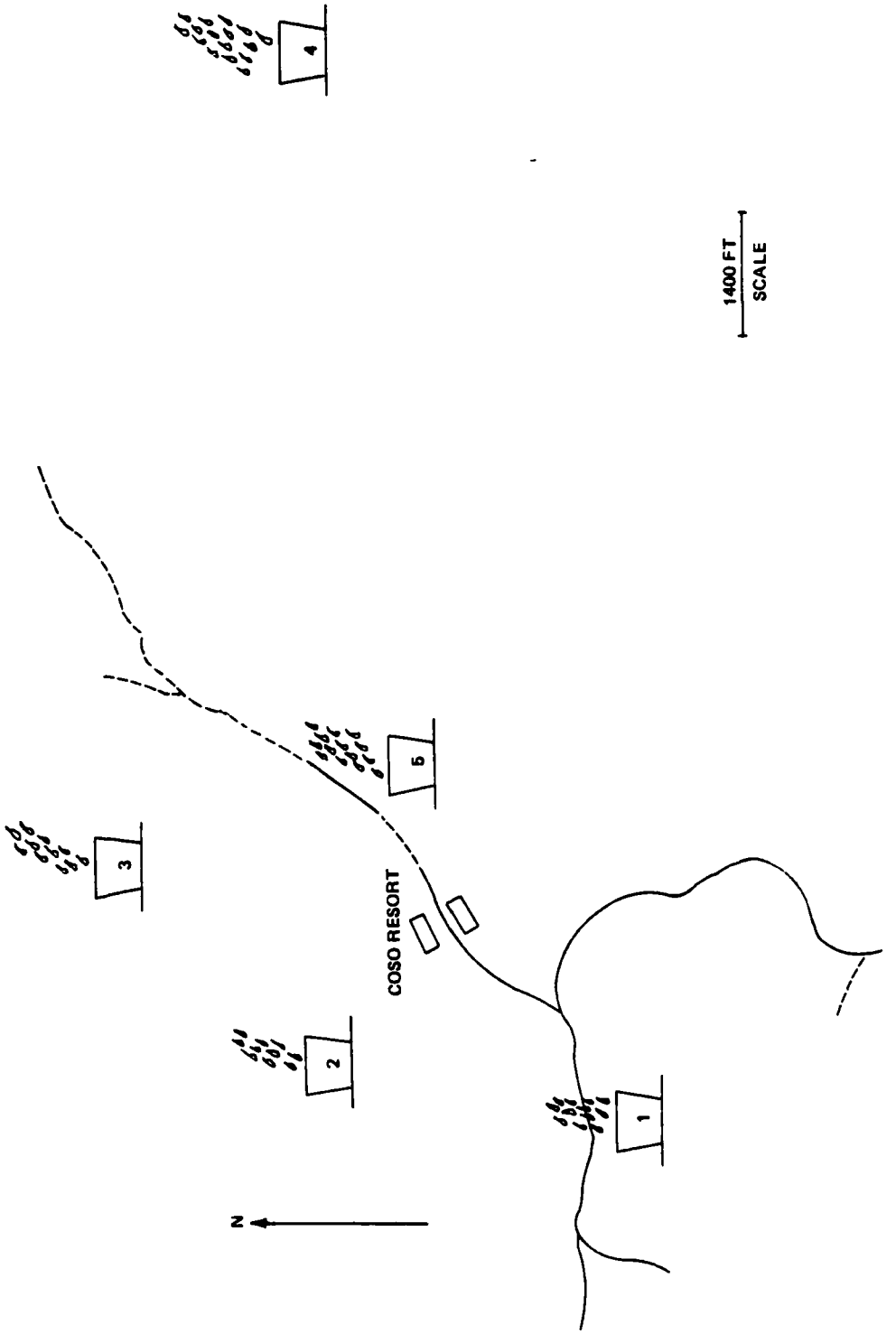


FIGURE 25. Rain Monitoring Station Locations.

Data collected from the Coso stations are presented in Table 8. Coso received 7.4 inches of rain in 1980, which is the first full year of rainfall monitoring in the area.

Rainfall in Rose Valley at the Los Angeles Department of Water and Power (LADWP) Haiwee Reservoir Plant is shown in Table 9 with a total of 7.75 inches for the year.

WATER ANALYSIS OF COSO WELLS

Water sampling of the three Coso wells being monitored for chemical analysis was conducted in June and November of 1980 with the analysis performed by BC Laboratories, Bakersfield, CA. Unfortunately, the analysis contract with BC had expired at the time the November samples were collected with the result that analysis was not performed until February 1981.

Results of the analysis are presented in Tables 10 and 11. Well description and locations were discussed in the previous reporting period.[1]

Large differences in sodium and chloride content is noted between the two analysis of the samples from Coso Well 1, and if compared to the analysis from October 1979 even larger differences are noted.[1] The well shows a significant reduction in sodium and chloride ion concentration over the time period of the three analysis.

Some of the differences in ion concentration may be attributed to sampling technique as the 1979 samples were collected using an open top bailer which allowed approximately 2/3 of the bailing sample to blow out of the container before the bailer reached the surface. The 1980 samples were collected using a downhole sampler which restricts the outflow of fluid from the sampler. Sodium chloride may have been concentrated by bailing in the open container as it was withdrawn for the well. Future water sampling will be done using the downhole sampler as the wire line winch becomes available for use.

TEMPERATURE LOGS OF COSO RESORT AREA WELLS

Temperature logs of Coso Wells 1, 4P-1, and 4K-1 are shown in Figures 26 through 28. Compared to the temperature profiles of the three

TABLE 8. Inches of Rainfall Recorded at Coso Rainfall Monitoring Stations.

Date	1		2		3		4		5	
	Funnel	Tipping bucket	Funnel	Tipping bucket	Funnel	Tipping bucket	Funnel	Tipping bucket	Funnel	Tipping bucket
1/05/80	0.10	...	0.10	0.10	1.10	0.12	0.10	0.10	0.10	0.10
1/14/80	0.86	0.73	0.82	0.67	0.77	0.87	1.00	0.90	0.88	0.84
1/18/80	0.02	0.03	0.00	0.01	0.00	0.02	0.00	0.01	0.00	0.00
1/30/80	0.42	0.35	0.36	0.31	0.37	0.38	0.54	0.45	0.44	0.40
2/14/80	1.30	1.24	1.35	1.10	1.15	0.01	0.97	0.01	0.94	0.89
2/19/80	...	...	...	...	...	...	1.93	...	2.08	1.90
2/20/80	2.30	1.78	2.37	2.19	2.38	...	0.55	...	0.41	0.31
2/21/80	...	...	0.14	0.14	0.13	...	0.38	...	0.20	0.18
3/02/80	0.53	...	0.42	0.37	0.44	...	0.49	...	0.42	0.39
3/06/80	0.24	...	0.25	0.24	0.26	...	0.32	0.33	0.32	0.28
3/18/80	0.11	...	0.23	...	0.19	...	0.05	0.06	0.19	0.22
4/23/80	0.32	...	0.33	0.28	0.40	...	0.34	0.35	0.30	...
4/29/80	0.52	...	0.50	0.42	0.50	...	0.49	0.49	0.50	...
5/02/80	0.23	...	0.19	0.19	0.20	...	0.13	0.16	0.17	...
5/15/80	0.06	...	0.06	0.13	0.04	...	0.05	0.13	0.02	0.09
5/28/80	0.03	...	0.05	0.04	0.04	...	0.01	0.02	0.01	0.04
7/01/80	0.03	...	0.04	0.08	0.05	0.01	0.01	0.13	0.04	0.07
9/10/80	...	...	...	...	...	...	...	0.19	...	0.09
10/24/80	...	...	0.08	...	...	...	...	...	...	...
12/08/80	0.23	0.20	0.25	0.24	0.25	0.29	0.29	...	0.24	0.24
Total	7.30		7.54		7.27		7.65		7.26	

Note: The rainfall recorded for a particular date includes any rain that occurred after the previous reading. The instruments are reset after each reading. Total rainfall for each station is the sum of the data in that column.

TABLE 9. Precipitation Data from Haiwee Reservoir, Rose Valley.

Date	Precipitation, in.	Cumulative Precipitation, in.
1-06-80	0.02	0.02
1-09-80	0.15	0.17
1-10-80	0.22	0.39
1-11-80	0.39	0.78
1-12-80	0.17	0.95
1-13-80	0.26	1.21
1-14-80	0.03	1.24
1-15-80	0.04	1.28
1-18-80	Trace	1.28
1-19-80	Trace	1.28
1-29-80	0.06	1.34
2-14-80	1.00	2.34
2-15-80	0.03	2.37
2-16-80	0.09	2.46
2-17-80	1.21	3.67
2-18-80	0.68	4.35
2-19-80	0.27	4.62
2-20-80	0.20	4.82
2-21-80	0.11	4.93
2-22-80	Trace	4.93
3-03-80	0.42	5.35
3-04-80	0.17	5.52
3-06-80	0.02	5.54
3-19-80	0.27	5.81
3-26-80	0.01	5.82
4-02-80	Trace	5.82
4-06-80	0.01	5.83
4-22-80	0.22	6.05
4-23-80	0.10	6.15
4-29-80	0.25	6.40
5-02-80	0.70	7.10
5-03-80	0.01	7.11
5-15-80	0.01	7.12
5-29-80	0.08	7.20
5-31-80	Trace	7.20
6-29-80	Trace	7.20
7-02-80	0.08	7.28
9-09-80	0.03	7.31
9-10-80	0.01	7.32
12-04-80	0.32	7.64
12-05-80	0.11	7.75

TABLE 10. Chemical Analysis of Coso Resort Area Wells.

Constituent, PPM	Coso Well 1 (6-5-80)	Well 4P-1 (6-5-80)	Well 4K-1 (6-5-80)
Calcium	43.00	9.00	13.50
Magnesium	0.20	0.11	0.32
Sodium	2,570.00	38.00	28.00
Potassium	370.00	17.00	6.90
Carbonate	0.00	0.00	0.00
Bicarbonate	188.80	103.90	0.00
Chloride	4,212.60	14.90	3.90
Sulfate	138.00	24.00	90.00
Nitrate	19.90	< 0.50	12.90
Fluoride	3.80	0.57	0.46
Total Iron	1.90	0.51	2.10
Manganese	0.09	0.01	0.10
Arsenic	7.00	0.03	< 0.01
Copper	0.04	0.05	0.04
Zinc	0.36	0.04	0.10
Ammonium	0.25	2.70	2.90
Lithium	24.00	0.05	0.04
Nitrite	0.095	< 0.001	0.018
Silica	340.00	189.00	114.00
Aluminum	< 0.10	< 0.10	0.20
Boron	74.00	0.50	0.07
Mercury	0.0003	0.0006	< 0.0002
Phosphate	0.10	0.20	< 0.10
Bromide	0.50	< 0.10	< 0.10
Tot Dissolved Solids	7897.00	348.00	275.00
Elect Conductivity K x 10^6	11,660.00	290.00	279.00
PH	7.4	7.6	3.7

wells in the previous reporting period the air column temperatures in the 1980 loggings are 3°F colder than in the previous loggings. Water temperature differences, however, show little variation in the two sets of data.

Geothermal gradients calculated from the 1980 loggings are:

Coso Well 1 $\quad \frac{249-66}{351} = 0.521°$ F/ft

Well 4P-1 $\quad \frac{218-61}{105} = 1.495°$ F/ft

Well 4K-1 $\quad \frac{215-56}{90} = 1.767°$ F/ft

TABLE 11. Chemical Analysis of Coso Resort Area Wells.

Constituent, PPM	Coso Well 1 (11-3-80)	Well 4P-1 (11-5-80)	Well 4K-1 (11-5-80)
Calcium	37.50	10.00	6.00
Magnesium	0.55	0.16	0.35
Sodium	1590.00	30.00	26.00
Potassium	200.00	14.10	5.50
Carbonate	0.00	0.00	0.00
Bicarbonate	176.70	53.70	14.00
Chloride	2580.70	1.80	< 1.80
Sulfate	80.00	56.00	80.00
Nitrate	2.70	3.50	5.30
Fluoride	3.80	0.80	0.44
Total Iron	0.25	0.25	1.80
Manganese	0.16	0.014	0.14
Arsenic	5.00	< 0.01	< 0.01
Copper	0.05	0.01	< 0.01
Zinc	0.59	0.07	0.01
Ammonium	0.70	2.10	2.90
Lithium	15.80	0.03	0.02
Nitrite	...	...	...
Silica	196.00	172.00	16.00
Aluminum	< 0.10	0.20	...
Boron	0.58	0.11	...
Mercury	0.0025	0.0005	< 0.0002
Phosphate	< 0.10	< 0.10	...
Bromide	< 0.10	< 0.10	...
Tot Dissolved Solids	4890.00	344.00	158.00
Elect Conductivity $K \times 10^6$	8000.00	210.00	230.00
PH	8.0	7.9	5.8

Hydrology of Coso Fault

There is evidence established through the monitoring work that the steam flow at the Schober's Resort site is directly connected to the steam flow in the 8-inch well near Coso Well 1, and data are available to determine if the flows are further connected to other monitored steam flows along the fault. This investigation will be the subject of a future paper as time and interest permit.

In addition, an investigation is required to determine the interconnection, if any, of the Coso wells and mud pots with the fissure which supplies the steam flows. This work will require the spiking of Well 4K-1 with sodium iodide, and monitoring the migration of the salt to nearby wells and mud pots. A downhole pressure sensor in each of the three wells would also indicate interconnection between the wells.

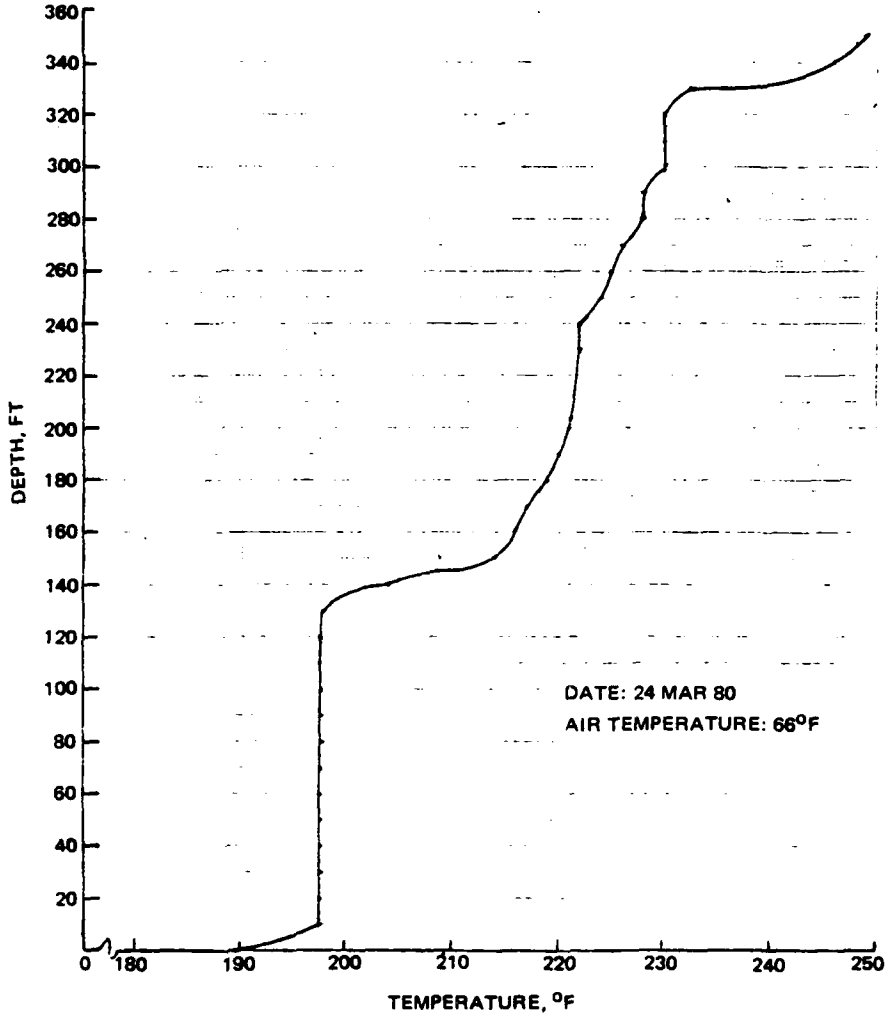


FIGURE 26. Temperature Log, Coso Well 1.

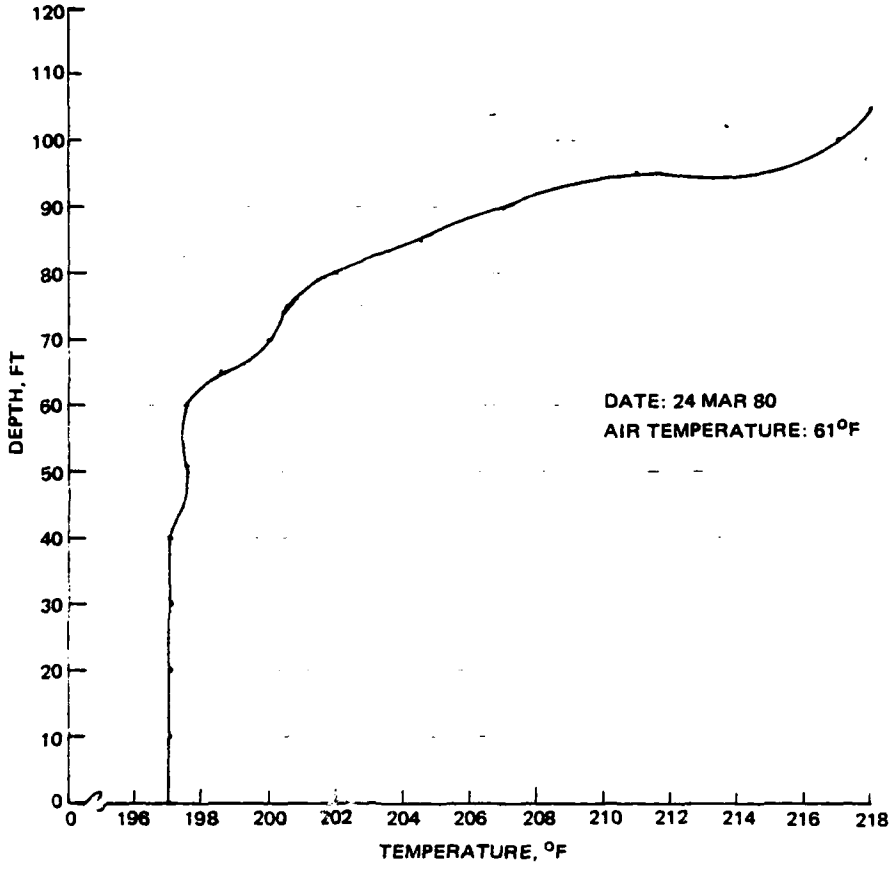


FIGURE 27. Temperature Log, Well 4P-1.

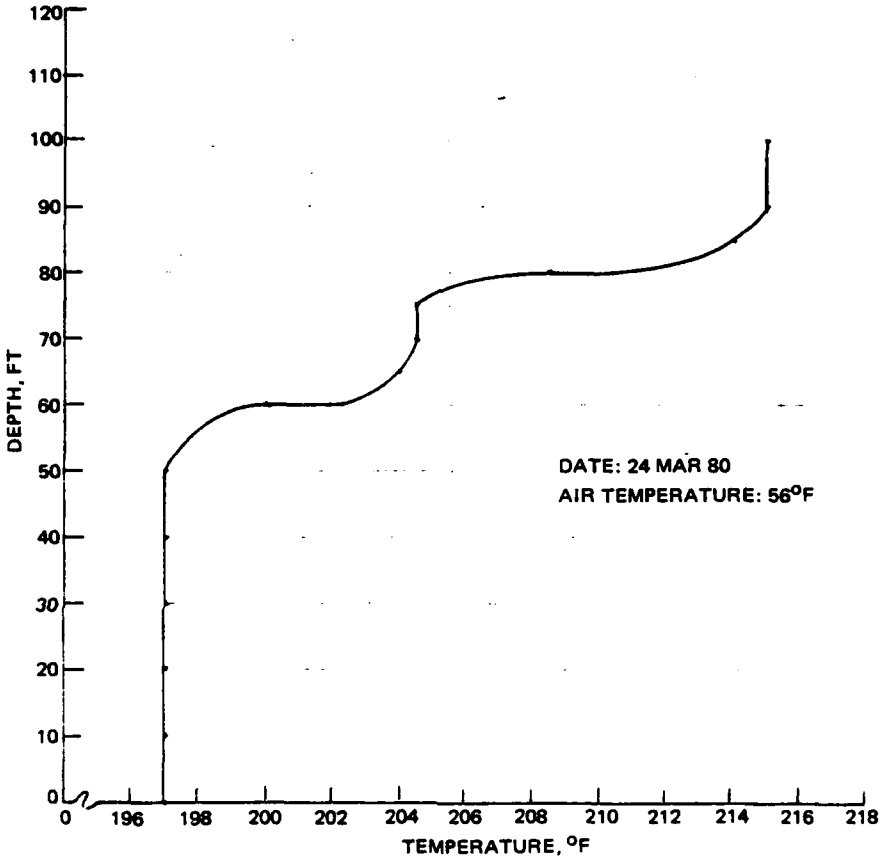


FIGURE 28. Temperature Log, Well 4K-1.

RECOMMENDATIONS TO IMPROVE COSO MONITORING

The following recommendations would improve the quality of the Coso monitoring program and will be implemented if approved by management.

1. Obtain downhole pressure sensors (continuous recording) for Coso Well 1, Well 4P-1, and 4K-1.

2. Initiate dialogue with vested interested groups to plan chemical species migration studies at the hot springs.

3. Initiate and install an evaporation pan monitoring site near the resort to correlate the mud pot water losses with a control. In addition a shallow observation hole should be drilled in the alluvium, 200 yards northwest of the hot spring, to monitor groundwater flow into the Coso fault zone.

4. Rework the Coso corrosion array to monitor the steam flow from the supply wells rather than the flow to the array, or as an option, insulate the steam flow lines which would result in a very constant steam flow through the present meter. The latter action might jeopardize the usefulness of the data collected thus far but would produce flows with little variance in the future.

SUMMARY

Steam Flows

Devils Kitchen Corrosion Array. The mean steam flow shows a constant, but insignificant, decrease in flow since monitoring was initiated in 1978. The decrease is 2% of the 1978 value.

Coso Corrosion Array. The mean flow in 1980 shows little change over the 1979 mean value, but a significant 15% increase over the 1978 mean flow value. The problem at this site is that changes in flows, as recorded by the flow meter, may be due to condensing steam and not to any change in supply from the steam wells. Remedial action consisting of insulating the steam flow supply line is definitely required at this site.

Two-Inch Steam Well (Coso No. 2). New equipment was installed in 1980. Mean flow is 140 pph with a standard deviation of 7.6 pph.

Eight-Inch Stove Pipe Well. Monitoring equipment was not available in 1980. Limited manometer readings taken throughout the year, dropped in October to half the value obtained from January through September. This indicates a significant decrease in flow. Pressure differential varied from 5 1/2- to 16-cm H_2O across a 1.70-inch-diameter orifice meter.

Schober's Resort. Monitoring equipment was not available in 1980. Manometer readings plotted on a pressure-time graph with readings from the 8-inch stove pipe well indicated that these two flows are interconnected. Pressure differential varied from 17- to 23-cm H_2O with a 0.316-inch-diameter orifice meter.

Photographic Investigation and Fluid Levels in Coso Mud Pots

A photographic examination was conducted and fluid levels of the mud pots were graded from highest to lowest each month for the years 1978 through 1980. These qualitative data show the same trend in fluid levels as the direct measurement data. (See Table 12.)

The south pool, having a larger evaporation surface, shows more change in fluid level from year to year than the smaller pools.

It is the authors' continuing conclusion that the water that accumulates on the surface in the mud pots, with the exception of traces of direct runoff and rainfall, is supplied solely by steam condensation from the fumarole activity. Relatively shallow groundwater probably enters the fault at moderate depths from the alluvial fan to the west and, on being heated to boiling temperature, rises as part of the steam flow into the mud pots where condensation occurs. The mud pots and pools increase in fluid level with the onset of cooler weather and dry up in the summer when evaporation rates are highest. This seasonal phenomena is probably enhanced cyclically by groundwater inflow into the fault from the alluvial fan to the west. This inflow is expected to change the small amount of superheat at shallow depths so that periods of higher recharge will result in greater condensation. However, with the lag in flow through the alluvium and the varying flow path lengths, there will be fluid level variations that are out of phase with the weather, and not all pools will fluctuate in level at the same time. The data bear this out.

When production of Coso reservoir fluids begin, the fluid levels in the mud pots will be monitored closely to determine if any reversal in the established pattern of water levels occur.

TABLE 12. Comparison of Fluid Levels in Coso Mud Pots and Pools, 1978-1980.

Data taken from photographic investigations.

1. South pool
2. Gray mud pots
3. Red and gray pool
4. Brown mud pots

Month		Fluid levels		
		Highest	Intermediate	Lowest
January	1	1980	1978	1979
	2	1980	1978	1979
	3	1980	1978	1979
	4	1980	1978	1979

TABLE 12. (Contd.)

Month		Fluid levels		
		Highest	Intermediate	Lowest
February	1	1978	1980	1979
	2	1978	1980	1979
	3	1980	1979--same level--1978	
	4	1980	1978	1979
March	1	1978	1980	1979
	2	1979	1980	1978
	3	1980	1979--same level--1978	
	4	1980	1978	1979
April	1	1978	1980	1979
	2	1979	dry-1980	dry-1978
	3	1979	1978	1980
	4	1979	dry-1980	dry-1978
May	1	1980	1978	1979
	2	1979	1980	1978
	3	1979	1980	1978
	4	1979	1980--same level--1978	
June	1	1980	1979	1978
	2	1980	1979	dry-1978
	3	1979	1980	dry-1978
	4	dry-1980	dry-1979	dry-1978
July	1	1979	1980	1978
	2	dry-1978	dry-1979	dry-1980
	3	1979	1978	1980
	4	dry-1978	dry-1979	dry-1980
August	1	1979	1980	1978
	2	dry-1978	dry-1979	dry-1980
	3	1979	dry-1980	dry-1978
	4	dry-1978	dry-1979	dry-1980
September	1	1979	1980	1978
	2	1978	1980	dry-1979
	3	1978	1979	1980
	4	dry-1978	dry-1979	dry-1980

TABLE 12. (Contd.)

Month		Fluid levels		
		Highest	Intermediate	Lowest
October	1	1979	1980--same	level--1978
	2	1979	1980	1978
	3	1979	1980	1978
	4	dry-1978	dry-1979	dry-1980
November	1	1979	1980--same	level--1978
	2	1979	1980	1978
	3	1979	1980	1978
	4	1979	1978	1980
December	1	1979	1980	1978
	2	1979	1980	1978
	3	1979	1980	1978
	4	1979	1980	1978

Water Level Monitoring

Coso Well 1. Water level is at 140 feet with considerable surface activity making water level recorder data unrealiable. No significant change in water level is indicated. Previously reported depth ranged from 139 to 148 feet.

Coso Well 4P-1. Water depth is 70.5 feet. The previously reported depth was 71 feet. Water level in this well is very constant.

Rainfall at Coso

Coso received 7.4 inches of rainfall in 1980 and only 2.67 inches in 1979. The LADWP at Haiwee Power Plant reported 7.75 inches in 1980 and 4.97 inches in 1979. This shows a significant increase in rainfall at both sites in 1980.

Water Chemistry

Coso Well 1. There was a significant decrease in sodium, potassium, and chloride ions in 1980 compared to the 1979 analysis. These differences may have resulted from ion concentration due to the use of an open bailer for sampling of the 1979 sample. Silica shows an increase in both the 1930 samples as compared to the 1979 sample.

Well 4P-1. The difference in analysis noted for this well in the sample collected on 5 June 1980, as compared to the 5 November 1980 and 3 October 1979 analysis, is a small increase in chloride content and a 100% increase in the bicarbonate ion. The change is not considered significant.

Well 4K-1. The bicarbonate and silica levels reported are suspect as there is a wide spread in analysis between both the 1980 and 1979 samples.

Temperature Logs

Temperature logs of Coso Well 1, Well 4P-1, and Well 4K-1 show no significant difference in temperatures from previous temperature well loggings.

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Appendix A

ADDITIONAL TABULAR DATA FROM THE COSO MONITORING SITES

TABLE A-1. Data Averages of Devils Kitchen Steam Flow (1980).

Date	High	Low
1-01	9.00	8.85
1-02	8.98	8.85
1-03	9.00	8.87
1-04	9.02	8.88
1-05	9.00	8.89
1-06	9.10	8.97
1-07	9.10	8.95
1-08	9.00	8.83
1-09	9.25	9.00
1-10	9.50	9.40
1-11	9.58	9.42
1-12	9.53	9.40
1-13	9.68	9.50
1-14	9.62	9.40
1-15	9.58	9.40
1-16	9.60	9.00
1-17	9.50	9.10
1-18	9.40	9.10
1-19	9.20	8.90
1-20	9.05	8.86
1-21	9.28	9.05
1-22	9.23	9.97
1-23	9.28	9.05
1-24	9.35	9.20
1-25	...	...
1-26	...	...
1-27	...	...
1-28	...	...
1-29	...	...
1-30	...	...
1-31	...	...
2-13	9.13	9.08
2-14	9.16	9.00
2-15	...	...
2-16	9.21	8.93
2-17	9.28	9.10
2-18	9.31	9.08
2-19	9.31	9.20
2-20	9.20	9.00
2-21	9.22	9.00
2-22	9.10	9.00
2-23	9.03	8.88
2-24	9.04	8.93
2-25	9.10	8.92

TABLE A-1. (Contd.)

Date	High	Low
2-26	9.12	9.00
2-27	...	...
2-28	9.18	9.00
2-29	9.10	8.90
3-02	9.26	9.13
3-03	9.15	8.92
3-04	...	...
3-05	9.20	9.02
3-06	9.26	8.95
3-07	...	...
3-08	...	...
3-09	...	...
3-10	9.20	9.07
3-11	9.21	9.03
3-12	9.02	8.81
3-13	9.10	8.92
3-14	9.20	9.00
3-15	9.19	8.90
3-16	8.90	8.76
3-17	9.20	8.90
3-18	9.30	8.98
3-19	8.93	8.80
3-20	9.12	8.80
3-21	...	...
3-22	9.10	8.86
3-23	9.10	8.88
3-24	9.20	8.88
3-25	9.12	8.93
3-26	9.10	8.92
3-27	8.90	8.75
3-28	9.08	8.80
3-29	9.08	8.80
3-30	9.30	8.86
3-31	9.42	9.12
4-01	9.18	9.00
4-02	8.92	8.78
4-03	8.96	8.78
4-04	9.05	8.91
4-05	9.01	8.90
4-06	9.09	8.80
4-07	8.95	8.77
4-08	9.02	8.81
4-09	9.20	8.95
4-10	9.11	8.95
4-11	9.00	8.83

TABLE A-1. (Contd.)

Date	High	Low
4-12	8.90	8.82
4-13	...	...
4-14	9.20	8.98
4-15	9.10	8.90
4-16	9.06	8.90
4-17	9.15	8.92
4-18	9.12	9.00
4-19	9.20	9.02
4-20	9.12	9.02
4-21	9.05	8.87
4-22	8.99	8.81
4-23	9.10	8.88
4-24	9.01	8.96
4-25	9.02	8.95
4-26	9.09	8.95
4-27	9.09	8.92
4-28	...	...
4-29	9.01	8.09
4-30	9.01	8.09
5-01	8.90	8.80
5-02	9.00	8.80
5-03	9.05	8.80
5-04	...	...
5-05	9.10	9.00
5-06	9.10	9.00
5-07	9.10	8.90
5-08	9.20	8.90
5-09	9.10	9.00
5-10	9.10	8.90
5-11	9.00	8.80
5-12	8.90	8.80
5-13	8.90	8.80
5-14	9.00	8.90
5-15	9.00	8.80
5-16	8.90	-8.80
5-17	8.90	8.70
5-18	...	...
5-19	...	...
5-20	...	...
5-21	9.10	8.90
5-22	9.10+	8.90+
5-23	9.10	8.90
5-24	8.90	8.70
5-25	9.00	8.70
5-26	9.00	8.80

TABLE A-1. (Contd.)

Date	High	Low
5-27	9.00	8.80
5-28	8.90	8.80
5-29	9.00	8.80
5-30	9.00	8.80
5-31	9.00	8.80+
6-01	9.00	8.80+
6-02	9.10	8.90
6-03	9.00	8.80
6-04	8.90	8.80
6-05	9.00	8.80+
6-06	8.90+	8.80
6-07	8.90	8.70+
6-08	9.00	8.80
6-09	9.10	8.90
6-10	9.10	8.90
6-11	8.90	8.80
6-12	9.00	8.80
6-13	9.10	8.90
6-14	9.00	8.80
6-15	8.90+	8.80
6-16	9.00	8.90
6-17	9.00	8.90
6-18	9.00	8.80
6-19	9.00	8.80
6-20	9.00	8.80
6-21	9.00	8.80
6-22	9.00+	8.80
6-23	9.01	8.90
6-24	9.00	8.81
6-25	8.89	8.80
6-26	9.00	8.80
6-27	9.00	8.89
6-28	9.00	8.89
6-29	9.01	8.89
6-30	9.04	8.85
7-01	8.90	8.75
7-02	8.95	8.75
7-03	9.05	8.85
7-04	9.10	8.90
7-05	9.00	8.85
7-06	9.00	8.75
7-07	9.25	8.85
7-08	9.00	8.85
7-09	9.00	8.85
7-10	9.05	8.85

TABLE A-1. (Contd.)

Date	High	Low
7-11	9.10	8.90
7-12	9.10	8.95
7-13	9.00	8.85
7-14	9.00	8.85
7-15	9.00	8.80
7-16	9.10	8.85
7-17	9.15	8.90
7-18	9.20	8.95
7-19	9.10	8.90
7-20	9.00	8.80
7-21	9.00	8.80
7-22	Interruption	8.85
7-23	9.10	Interruption
7-24	9.10	8.90
7-25	9.05	8.90
7-26	9.10	8.90
7-27	9.10	8.95
7-28	9.10	8.95
7-29	9.10	8.90
7-30	9.10	8.85
7-31	9.10	8.85
8-01	9.10	8.90
8-02	9.15	8.90
8-03	9.20	9.00
8-04	9.15	8.95
8-05	9.10	8.90
8-06	9.05	8.85
8-07	9.05	8.90
8-08	9.05	8.90
8-09	9.10	8.90
8-10	9.05	8.90
8-11	9.10	8.90
8-12	9.10	8.90
8-13	9.10	8.90
8-14	9.10	8.90
8-15	9.00	8.80
	Interruption	
8-16	9.00	8.85
8-17	9.00	8.85
8-18	9.10	8.90
8-19	8.85	8.75
8-20	8.90	8.70
8-21	9.05	8.85
8-22	9.10	8.90
8-23	8.95	8.80

TABLE A-1. (Contd.)

Date	High	Low
8-24	9.00	8.80
8-25	...	8.80
		Interruption
8-26	9.00	8.80
8-27	9.05	8.85
		Interruption
8-28	Interruption	8.80
		Interruption
8-29	8.95	8.80
	Interruption	
8-30	Interruption	8.85
8-31	9.00	8.90
		Interruption
9-01	Interruption	Interruption
9-02	Interruption	Interruption
9-03	Interruption	Interruption
9-04	9.00	8.85
9-05	9.00	8.85
9-06	9.10	8.90
9-07	9.10	Interruption
9-08	8.95	8.85
9-09	9.00	8.85
9-10	9.00	8.85
9-11	9.00	8.90
9-12	9.10	8.90
9-13	Interruption	Interruption
9-14	Interruption	Interruption
9-15	No Chart	No Chart
9-16	...	...
9-17	...	...
9-18	...	...
9-19	...	...
9-20	...	...
9-21	...	...
9-22	No Chart	No Chart
9-23	9.00	8.85
9-24	9.00	8.85
9-25	9.00	8.85
9-26	9.00	8.80
9-27	9.00	8.85
9-28	8.95	8.85
9-29	8.90	8.75
9-30	8.95	8.80
10-01	8.95	8.80
10-02	8.95	8.80

TABLE A-1. (Contd.)

Date	High	Low
10-03	9.00	8.85
10-04	9.00	8.85
10-05	Interruption	Interruption
10-06	9.00	8.85
10-07	9.00	8.90
10-08	9.10	8.90
10-09	9.00	8.90
10-10	9.00	8.90
10-11	9.00	8.90
10-12	9.00	8.95
10-13	9.05	8.90
10-14	9.05	8.95
10-15	9.00	8.90
10-16	8.90	8.80
10-17	8.80	8.70
10-18	8.85	8.70
10-19	8.90	8.80
10-20	8.90	8.80
10-21	9.00	8.85
10-22	8.90	8.85
10-23	8.85	8.80
10-24	8.90	8.80
10-25	9.15	8.95
10-26	9.10	8.90
10-27	8.85	8.75
10-28	8.80	8.70
10-29	8.85	8.75
10-30	8.90	8.80
10-31	8.90	8.80
11-01	8.95	8.80
11-02	8.90	8.80
11-03	8.85	8.80
11-04	8.90	8.80
11-05	9.00	8.90
11-06	8.95	8.85
11-07	9.00	8.90
11-08	9.00	8.90
11-09	9.00	8.90
11-10	9.00	8.90
11-11	...	8.80
11-12	8.85	8.80
11-13	8.85	8.75
11-14	8.95	8.75
11-15	8.95	8.80
11-16	8.85	8.75

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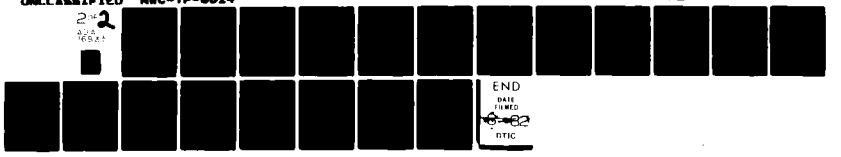

TABLE A-1. (Contd.)

Date	High	Low
11-17	8.85	8.75
11-18	8.90	8.80
11-19	8.90	8.80
11-20	8.85	8.75
11-21	9.10	8.60
11-22	9.10	8.95
11-23	9.10	8.95
11-24	8.60	8.45
11-25	8.65	8.45
11-26	8.60	8.50
11-27	8.70	8.50
11-28	8.80	8.60
11-29	8.90	8.75
11-30	9.00	8.80
12-01	8.80	8.65
12-02	8.75	8.65
12-03	8.85	8.70
12-04	8.85	8.65
12-05	8.80	8.65
12-06	8.85	8.70
12-07	8.80	8.65
12-08	8.70	8.55
12-09	8.70	8.55
12-10	8.70	8.55
12-11	8.85	8.70
12-12	8.85	8.75
12-13	...	...
12-14	...	...
12-15	...	8.70
12-16	8.85	8.70
12-17	8.90	8.75
12-18	8.90	8.75
12-19	8.80	8.65
12-20	...	8.65
12-21	...	...
12-22	8.80	8.55
12-23	...	...
12-24	...	...
12-25	...	...
12-26	...	...
12-27	...	...
12-28	...	...
12-29	8.80	8.70
12-30	8.90	8.70
12-31	8.85	8.70

TABLE A-2. Data Averages of Coso Corrosion Array Steam Flow Rate.

Date	High	Low
1-01	7.50	7.35
1-02	7.40	7.30
1-03	7.47	7.33
1-04	7.58	7.42
1-05	7.60	7.43
1-06	7.79	7.60
1-07	7.87	7.70
1-08	7.79	7.58
1-09	8.03	7.71
1-10	8.00	7.43
1-11	7.50	7.40
1-12	7.25	7.10
1-13	7.30	7.11
1-14	7.25	7.00
1-15	7.00	6.82
1-16	7.00	6.81
1-17	7.25	6.95
1-18	7.40	7.02
1-19	7.05	6.52
1-20	6.58	6.32
1-21	6.80	6.56
1-22	6.68	6.40
1-23	6.58	6.30
1-24	7.10	6.60
1-25	7.26	7.13
1-26	7.26	7.08
1-27	7.23	7.04
1-28	7.19	7.03
1-29	7.28	6.67
1-30	6.67	6.13
1-31	6.20	6.04
2-01	6.30	6.09
2-02	6.27	6.11
2-03	6.48	6.20
2-04	6.40	6.26
2-05	6.60	6.30
2-06	6.80	6.50
2-07	6.88	6.59
2-08	6.58	6.30
2-09	6.28	6.07
2-10	6.58	6.28
2-11	6.58	6.50
2-12	...	...
2-13	...	...

TABLE A-2. (Contd.)

Date	High	Low
2-14	5.80*	5.80*
2-15	5.80*	5.80*
2-16	...	...
2-17	...	...
2-18	...	...
2-19	...	...
2-20	...	...
2-21	...	...
2-22	5.68	5.43
2-23	5.40	5.10
2-24	...	...
2-25	5.68	5.58
2-26	5.80	5.58
2-27	6.00	5.71
2-28	6.10	5.89
2-29	5.98	5.70
3-01	6.08	5.80
3-02	6.30	6.01
3-03	6.38	6.04
3-04	6.00	5.82
3-05	6.30	6.00
3-06	6.50	6.18
3-07	6.18	6.85
3-08	5.90	5.70
3-09	5.90	5.65
3-10	6.13	5.80
3-11	6.20	5.90
3-12	5.72	5.49
3-13	5.84	5.53
3-14	6.10	5.71
3-15	6.18	5.70
3-16	5.70	5.27
3-17	...	...
3-18	...	...
3-19	...	...
3-20	...	...
3-21	...	...
3-22	...	...
3-23	...	...
3-24	...	...
3-25	...	...
3-26	...	...
3-27	6.10	5.86

*Questionable data as chart fouled.

TABLE A-2. (Contd.)

Date	High	Low
3-28	6.02	5.65
3-29	5.70	5.40
3-30	5.76	5.31
3-31	6.61	5.80
4-01	6.40	6.16
4-02	6.10	5.70
4-03	5.78	5.50
4-04	6.08	5.68
4-05	6.02	5.88
4-06	6.08	5.68
4-07	5.68	5.42
Instrument out of operation due to broken center hub. Chart does not turn. Range during week of April 7-14 is 5.52 - 6.52.		
5-02	5.60	5.40
5-03	5.60	5.40
5-04	5.70	5.50
5-05	6.00	5.60
5-06	6.00	5.70
5-07	5.90	5.70
5-08	6.00	5.60
5-09	6.10	5.90
5-10	6.10	5.80
5-11	5.80	5.60
5-12	5.60	5.40
5-13	5.80	5.50
5-14	6.00	5.70
5-15	5.90	5.60
5-16	5.80	5.50
5-17	5.60	5.40
5-18	5.60	5.40
5-19	5.70	5.40
5-20	5.90	5.60
5-21	5.90	5.70
5-22	6.00	5.70
5-23	6.10	5.80
5-24	5.60	5.80
5-25	5.70	5.00
5-26	5.80	5.60
5-27	5.80	5.70
5-28	5.70	5.50
5-29	5.80	5.50
5-30	6.00	5.70
5-31	5.50	5.80
6-01	6.00	5.80

TABLE A-2. (Contd.)

Date	High	Low
6-02	6.30	5.90
6-03	6.00	5.70
6-04	5.80	5.60
6-05	5.90	5.70
6-06	5.80	5.60
6-07	5.60	5.50
6-08	5.70	5.50
6-09	5.80	5.00
6-10	5.90	5.70
6-11	5.70	5.40
6-12	5.70	5.40
6-13	5.80	5.50
6-14	5.60	5.40
6-15	5.60	6.50
6-16	5.70	5.40
6-17	5.70	5.60
6-18	5.80	5.60
6-19	5.70	5.50
6-20	5.70	5.50
6-21	5.70	5.50
6-22	5.80	5.50
6-23	5.80	5.70
6-24	5.70	5.50
6-25	5.65	5.45
6-26	5.65	5.40
6-27	5.50	5.25
6-28	5.60	5.45
6-29	5.70	5.40
6-30	5.65	5.40
7-01	5.40	5.20
7-02	5.40	5.15
7-03	5.65	5.30
7-04	5.75	5.50
7-05	5.65	5.45
7-06	5.70	5.50
7-07	5.70	5.50
7-08	5.60	5.40
7-09	5.50	5.30
7-10	5.50	5.30
7-11	5.65	5.45
7-12	5.70	5.50
7-13	5.60	5.35
7-14	5.50	5.30
7-15	5.60	5.20
7-16	5.75	5.20

TABLE A-2. (Contd.)

Date	High	Low
7-17	5.90	5.45
7-18	5.95	5.60
7-19	5.80	5.40
7-20	5.70	5.30
7-21	5.60	5.25
7-22	5.75	5.20
7-23	5.80	5.20
7-24	5.90	5.40
7-25	5.85	5.40
7-26	5.90	5.25
7-27	5.75	5.25
7-28	6.10	5.40
7-29	6.00	5.55
7-30	6.00	5.50
7-31	6.00	5.40
8-01	6.10	5.50
8-02	6.10	5.60
8-03	6.70	5.80
8-04	6.25	5.80
8-05	6.10	5.70
8-06	6.10	5.60
8-07	6.00	5.50
8-08	6.15	5.60
8-09	6.20	5.50
8-10	6.15	5.50
8-11	6.20	5.50
8-12	6.25	5.60
8-13	6.20	5.60
8-14	6.15	5.70
8-15	6.00	5.50
8-16	5.85	5.45
8-17	6.00	5.45
8-18	5.80	5.55
8-19	5.50	5.00
8-20	5.60	5.00
8-21	5.80	5.10
8-22	5.70	5.30
8-23	5.50	5.10
8-24	5.80	5.10
8-25	5.60	5.00
8-26	5.70	5.10
8-27	5.85	5.30
8-28	5.75	5.20
8-29	5.60	5.20
8-30	5.90	5.20

TABLE A-2. (Contd.)

Date	High	Low
8-31	5.85	5.35
9-01	5.70	5.30
9-02	5.80	5.10
9-03	5.70	5.10
9-04	5.70	5.10
9-05	5.70	5.00
9-06	5.80	4.90
9-07	Interruption	5.40
9-08	...	Interruption
9-09	No Chart	...
9-10	...	...
9-11	...	...
9-12	...	...
9-13	...	...
9-14	...	...
9-15	...	...
9-16	...	...
9-17	...	...
9-19	...	...
9-20	...	...
9-21	...	...
9-22	...	...
9-23	...	...
9-24	No Chart	...
9-25	No Chart	...
9-26	...	...
9-27	...	...
9-28	...	...
9-29	...	...
9-30	No Chart	...
10-01	...	...
10-02	...	...
10-03	...	...
10-04	...	...
10-05	...	...
10-06	...	...
10-07	...	...
10-08	5.90	5.70
		Interruption
10-09	No Chart	...
10-10	...	...
10-11	...	...
10-12	...	...
10-13	...	...
10-14	6.00	5.70

TABLE A-2. (Contd.)

Date	High	Low
10-15	5.80	5.60
10-16	5.70	5.30
10-17	5.50	5.10
10-18	5.50	5.00
10-19	5.65	5.00
10-20	5.40	5.00
10-21	5.80	Interruption
10-22	5.80	5.25
10-23	5.70	5.00
10-24	5.70	5.00
10-25	6.00	5.30
10-26	5.95	5.35
10-27	5.55	5.20
10-28	5.35	4.70
10-29	5.45	4.85
10-30	5.65	5.00
10-31	5.70	5.10
11-01	5.75	5.10
11-02	5.75	5.10
11-03	5.20	5.10
11-04	5.80	5.05
11-05	5.95	5.20
11-06	5.95	5.35
11-07	6.00	5.25
11-08	8.00	5.35
11-09	6.05	5.40
11-10	6.00	5.45
11-11	5.50	5.40
11-12	5.55	...
11-13	5.80	4.85
11-14	5.65	4.70
11-15	5.50	5.15
11-16	5.20	4.60
11-17	5.60	4.80
11-18	5.70	4.70
11-19	5.85	4.30
11-20	4.95	4.20
11-21	5.50	4.30
11-22	6.00	5.00
11-23	6.30	5.50
11-24	No Info	No Info
11-25	...	...
11-26	...	...
11-27	...	...
11-28	...	...

TABLE A-2. (Contd.)

Date	High	Low
11-29	...	...
11-30	No Info	No Info
12-01	...	...
12-02	...	...
12-03	5.90	5.50
12-04	5.85	5.40
12-05	5.70	5.30
12-06	5.70	5.25
12-07	5.35	4.70
12-08	5.10	4.70
12-09	5.20	4.60
12-10	5.30	4.60
12-11	5.70	4.80
12-12	5.80	5.25
12-13	5.60	5.00
12-14	5.50	4.80
12-15	5.70	5.00
12-16	6.00	5.40
12-17	6.00	5.40
12-18	5.70	5.20
12-19	5.65	5.20
12-20	...	5.30
12-21	...	...
12-22	...	...
12-23	5.50	5.00
12-24	5.50	5.00
12-25	5.60	5.00
12-26	5.80	5.10
12-27	5.70	5.25
12-28	5.80	5.20
12-29	5.70	5.10
12-30	5.85	5.30
12-31	6.10	5.50

TABLE A-3. Coso Well No. 2 Temperature and Steam Flow (1980).

Date	Temp, °F		Flow	
	High	Low	High	Low
1-25	...	...	9.20	8.35
1-26	...	...	9.15	8.30
1-27	...	...	9.31	8.29
1-28	...	...	9.06	8.28
1-29	...	...	8.92	7.90
1-30	...	...	8.40	7.32
1-31	...	...	8.25	7.30
2-01	...	...	8.56	7.38
2-02	...	...	8.59	7.50
2-03	...	...	9.00	7.65
2-04	...	...	8.70	7.85
2-05	200	194	8.82	7.82
2-06	200	194	9.11	8.10
2-07	195	175	8.61	8.00
2-08	195	165	8.57	7.83
2-09	194	190	8.58	7.50
2-10	195	190	8.83	7.62
2-11	195	190	8.90	7.96
2-12	194	175	8.98	7.87
2-13	198	177	8.59	8.00
2-14	195	180	8.45	8.15
2-15	198	189	8.36	7.80
2-16	198	180	8.32	7.75
2-17	200	171	9.00	8.25
2-18	192	170	8.98	8.36
2-19	198	168	...	...
2-20	...	...	...	...
2-21	...	...	...	...
2-22	...	...	...	...
2-23	...	...	...	...
2-24	...	...	...	...
2-25	202	193	8.73	7.96
2-26	203	192	8.87	7.88
2-27	201	192	9.03	8.10
2-28	199	191	9.10	8.25
2-29	192	185	9.10	8.20
3-01	201	196	8.88	8.25
3-02	195	177	9.00	8.11
3-03	198	180	9.33	8.00
3-04	201	192	8.91	8.00
3-05	198	168	8.93	8.23
3-06	198	175	8.73	8.25
3-07	198	187	8.88	7.91
3-08	204	195	8.80	7.85
3-09	201	192	8.90	7.90

TABLE A-3 (Contd.)

Date	Temp, °F		Flow	
	High	Low	High	Low
3-10	202	195	9.00	8.60
3-11	205	175	9.30	8.30
3-14	200	192	9.43	8.30
3-15	200	182	9.40	8.35
3-16	201	193	8.80	7.70
3-17	198	161	9.30	8.50
3-18	198	158	9.00	8.20
3-19	200	186	8.90	7.95
3-20	201	188	9.30	8.40
3-21	200	155	9.00	8.30
3-22	200	178	8.90	8.20
3-23	200	185	9.10	8.40
3-24	201	171	9.30	8.20
3-25	200	181	9.00	8.35
3-26	198	188	9.25	8.25
3-27	200	170	9.15	7.90
3-28	201	188	8.95	7.80
3-29	204	185	9.25	8.35
3-30	202	170	9.62	8.30
3-31	188	162	9.30	8.20
4-01	202	179	9.15	8.35
4-02	202	188	8.90	7.80
4-03	203	192	8.90	8.10
4-04	200	188	9.10	8.35
4-05	203	188	9.20	8.20
4-06	205	183	9.99	8.05
4-07	201	174	9.60	8.10
4-08	195	177	8.75	7.97
4-09	208	194	9.20	8.30
4-10	...	...	...	...
4-11	...	...	...	...
4-12	...	...	...	...
4-13	...	...	...	...
4-14	206	195	9.60	8.40
4-15	206	195	9.30	8.48
4-16	206	193	9.20	8.10
4-17	206	198	9.35	8.30
4-18	206	195	9.55	8.45
4-19	205	191	9.50	8.50
4-20	203	191	9.60	8.50
4-21	202	188	9.00	7.95
4-22	199	182	8.70	7.90
4-23	202	196	8.80	8.00
4-24	202	194	9.10	8.20

TABLE A-3 (Contd.)

Date	Temp, °F		Flow	
	High	Low	High	Low
4-25	206	196	9.32	8.40
4-26	206	196	9.40	8.40
4-27	206	195	9.31	8.50
4-28	206	181	8.91	8.20
4-29	203	190	9.10	8.12
4-30	...	...	...	...
5-01	...	...	...	...
5-02	...	...	...	...
5-03	...	...	...	...
5-04	...	...	...	...
5-05	206	198	9.30	8.34
5-06	206	194	9.90	8.43
5-07	206	191	9.87	8.40
5-08	201	192	9.90	8.70
5-09	200	182	9.83	8.48
5-10	203	189	9.21	8.00
5-11	198	189	8.90	7.90
5-12	206	195	8.90	8.10
5-13	201	183	8.90	8.40
5-14	204	186	9.20	8.39
5-15	208	195	9.30	8.15
5-16	207	193	9.22	8.27
5-17	207	193	9.13	8.30
5-18	210	200	9.20	8.30
5-19	205	195	9.33	8.50
5-20	204	194	9.30	8.25
5-21	198	183	9.21	8.40
5-22	199	183	9.09	7.90
5-23	192	183	9.10	7.90
5-24	201	179	8.70	7.78
5-25	207	195	8.70	7.85
5-26	204	195	8.80	7.90
5-27	203	185	8.85	7.90
5-28	202	195	8.65	8.30
5-29	204	194	8.90	8.10
5-30	204	196	9.00	8.00
5-31	204	188	8.93	8.20
6-01	206	198	9.12	8.31
6-02	206	192	9.50	8.20
6-03	206	194	9.16	7.95
6-04	206	194	9.01	7.91
6-05	207	194	9.10	7.30
6-06	205	195	8.90	7.25
6-07	207	196	8.90	7.95

TABLE A-3 (Contd.)

Date	Temp, °F		Flow	
	High	Low	High	Low
6-08	207	198	9.02	8.10
6-09	207	198	9.28	8.30
6-10	205	198	9.89	8.00
6-11	205	198	9.10	7.82
6-12	206	197	9.10	7.80
6-13	206	198	9.13	7.80
6-14	206	196	9.10	8.02
6-15	210	200	9.10	8.20
6-16	208	198	9.26	8.30
6-17	208	199	9.25	8.15
7-01	207	201	8.80	7.95
7-02	209	198	8.75	7.70
7-03	208	198	9.10	7.85
7-04	208	198	9.25	8.00
7-05	210	198	9.20	7.90
7-06	209	194	9.25	8.10
7-07	209	201	9.20	8.10
7-08	208	200	9.10	8.10
7-09	209	198	9.10	8.00
7-10	209	198	9.20	7.90
7-11	209	200	9.80	8.20
7-12	208	200	9.20	8.15
7-13	208	200	9.00	8.00
7-14	208	202	9.10	8.15
7-15	210	199	9.20	8.15
7-16	210	200	9.30	8.30
7-17	209	202	9.40	8.55
7-18	210	204	9.45	8.50
7-19	210	202	9.30	8.40
7-20	213	202	9.30	8.30
7-21	213	202	9.80	8.50
7-22	209	200	9.30	8.40
7-23	210	200	9.30	8.30
7-24	210	203	9.40	8.55
7-25	212	202	9.35	8.55
7-26	212	201	9.35	8.40
7-27	212	198	9.30	8.55
7-28	212	200	9.20	8.45
7-29	212	202	9.20	8.40
7-30	212	200	9.30	8.40
7-31	210	200	9.15	8.30
8-01	212	204	9.30	8.40
8-02	213	204	9.40	8.40
8-03	212	193	9.50	8.60

TABLE A-3 (Contd.)

Date	Temp, °F		Flow	
	High	Low	High	Low
8-04	212	202 -	9.40	8.50
8-05	208	193	9.20	8.30
8-06	209	201	9.30	8.20
8-07	209	202	9.25	8.25
8-08	212	201	9.45	8.60
8-09	211	201	9.45	8.40
8-10	212	198	9.40	8.50
8-11	214	206	9.50	8.60
8-12	211	204	9.45	8.60
8-13	210	203	9.40	8.30
8-14	209	200	9.35	8.30
8-15	208	202	8.95	8.10
8-16	206	201	8.85	8.00
8-17	211	202	9.00	8.10
8-18	211	184	9.05	8.20
8-19	212	200	8.70	7.95
8-20	210	198	8.80	7.90
8-21	210	202	9.05	8.10
8-22	210	192	8.90	8.20
8-23	208	199	8.70	7.95
8-24	210	200	8.65	7.75
8-25	211	202	8.70	7.90
8-26	212	200	8.85	7.85
8-27	211	199	9.00	8.00
8-28	210	200	8.95	8.00
8-29	209	200	8.80	8.00
8-30	210	198	9.00	8.00
8-31	212	202	9.00	8.10
9-01	211	200	8.95	8.10
9-02	212	200	9.00	8.05
9-03	210	201	9.00	8.00
9-04	212	201	9.00	8.00
9-05	212	202	9.00	8.10
9-06	211	203	9.10	8.20
9-07	206	184	9.00	8.45
9-08	210	194	8.90	8.00
9-09	208	183	8.50	8.00
9-10	209	200	8.80	7.90
9-11	210	203	8.90	8.15
9-12	209	195	9.00	8.25
9-13	209	186	9.00	8.30
9-14	208	198	8.65	8.10
9-15	210	198	8.85	8.00
9-16	209	198	8.70	8.10

TABLE A-3 (Contd.)

Date	Temp, °F		Flow	
	High	Low	High	Low
9-17	210	200	9.15	8.35
9-18	210	196	9.15	8.35
9-19	211	202	9.10	8.10
9-20	210	188	9.00	8.15
9-21	210	194	8.90	8.20
9-22	206	196	8.65	8.30
9-23	210	198	9.10	8.50
9-24	210	198	9.10	8.00
9-25	210	202	9.20	8.35
9-26	210	200	9.10	8.25
9-27	212	200	9.10	8.20
9-28	212	200	9.10	8.25
9-29	210	194	9.10	8.30
9-30	210	204	9.10	8.25
10-01	210	204	9.20	8.35
10-02	208	200	9.20	8.40
10-03	210	202	9.15	8.45
10-04	210	202	9.10	8.40
10-05	212	204	9.10	8.30
10-06	213	204	9.10	9.30
10-07	210	206	9.10	8.35
10-08	210	204	9.20	8.90
10-09	210	200	9.15	8.45
10-10	210	199	9.00	8.25
10-11	210	200	Interruption	...
10-12	Interruption	...	...	...
10-13	Interruption	...	...	...
10-14	Interruption	...	...	...
10-15	194	178	8.75	8.35
10-16	206	176	8.50	8.20
10-17	208	186	8.60	7.90
10-18	208	192	8.75	7.90
10-19	208	198	8.75	8.15
10-20	210	202	8.80	8.10
10-21	208	194	9.00	8.25
10-22	208	200	8.90	8.45
10-23	212	204	8.80	8.30
10-24	213	198	8.75	8.00
10-25	208	174	9.10	8.35
10-26	208	172	Interruption	...
10-27	Interruption	...	...	...
10-28	210	192	8.50	7.30
10-29	208	194	8.45	7.60
10-30	210	198	8.70	7.40

TABLE A-3 (Contd.)

Date	Temp, °F		Flow	
	High	Low	High	Low
10-31	208	198	8.70	8.10
11-01	210	198	8.80	8.00
11-02	208	198	8.75	8.15
11-03	212	202	8.80	8.20
11-04	211	200	8.85	8.35
11-05	211	202	9.00	8.40
11-06	210	198	9.10	8.45
11-07	210	192	9.10	8.30
11-08	212	192	9.05	8.30
11-09	210	190	9.25	8.40
11-10	212	187	9.10	8.40
11-11	...	...	...	...
11-12	210	190	8.70	8.50
11-13	207	185	8.85	8.50
11-14	210	190	8.55	7.85
11-15	195	163	8.70	8.40
11-16	205	185	8.85	7.75
11-17	205	200	8.90	7.70
11-18	207	200	8.20	7.60
11-19	208	200	8.85	7.75
11-20	208	187	8.40	7.70
11-21	210	193	8.90	7.90
11-22	208	187	8.60	8.20
11-23	207	178	8.80	8.10
11-24	203	180	8.00	7.00
11-25	208	193	7.30	7.00
11-26	210	195	7.50	7.20
11-27	210	200	7.85	7.30
11-28	208	197	8.05	7.15
11-29	210	193	8.40	7.90
11-30	195	175	8.60	8.25
12-01	210	185	7.95	7.80
12-02	205	195	8.00	7.80
12-03	208	175	8.30	7.90
12-04	203	167	8.50	8.05
12-05	210	183	8.05	7.95
12-06	207	178	8.10	7.80
12-07	205	175	8.00	7.25
12-08	203	175	7.60	7.20
12-09	208	187	7.20	6.60
12-10	210	190	7.40	6.60
12-11	210	190	7.80	7.10
12-12	210	193	7.90	7.60
12-13	211	200	7.70	7.30

TABLE A-3 (Contd.)

Date	Temp, °F		Flow	
	High	Low	High	Low
12-14	205	185	...	...
12-15	205	187	...	7.35
12-16	211	190	8.20	7.40
12-17	210	195	8.20	7.90
12-18	207	195	8.15	7.95
12-19	207	195	8.00	7.75
12-20	210	200	7.95	7.75
12-21	207	200	7.90	7.70
12-22	209	202	7.90	7.75
12-23	208	200	7.70	7.60
12-24	210	193	7.60	7.45
12-25	210	200	7.65	7.50
12-26	212	201	7.85	7.50
12-27	209	198	7.80	7.70
12-28	211	202	7.90	7.70
12-29	210	200	7.75	7.55
12-30	210	200	7.90	7.60
12-31	210	200	8.10	7.75

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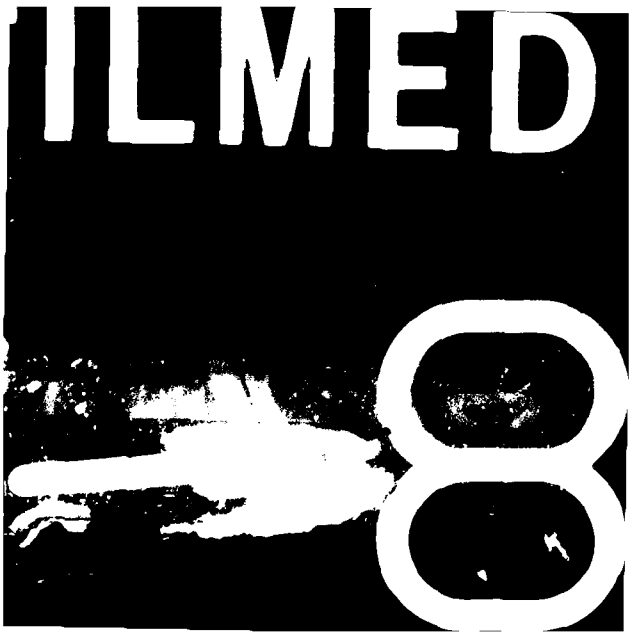
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